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ABSTRACT

The theme of this computer education conference was "Technology across the Curriculum." These proceedings include papers on the application of educational technologies in school administration, business education, computer science education, mathematics, science, social studies, English and language arts, elementary education, gifted and talented education, special education, vocational education, and university-level education. A variety of applications of the Logo programing language and of telecommunications are described. Over 190 papers are included, some with abstracts and references. (GL)

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TECHNOLOGY ACROSS THE CURRICULUM

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The 8th Annual TCEA State Conference
February 24—27, 1988
at InfoMart in Dallas

TECHNOLOGY ACROSS THE CURRICULUM

PROCEEDINGS

Texas Computer Education Association

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Apple Macintosh - IBM System 36 Connectivity for Administrative Applications

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The Raymondville Independent School District has recently implemented a cost effective local and remote System 36 network employing Apple Macintosh Computers as the primary data entry device. Administrative uses of this unique network include student attendance reporting and accounting, grade reporting, scheduling, and PEIMS data entry. When not in IBM 5291 terminal emulation mode, the Macs provide campus and Central Office personnel with a computer rich in text and graphics capabilities. This session will discuss the rationale, planning, selection of hardware/software, and communication devices, etc. which allow the successful and relatively easy connection of these very different architectures.

The automation and computerization of administrative services in the Raymondville Independent School District has been greatly enhanced by the establishment of a network connecting the district's five campuses and Central Office to it's IBM System 36 mini-computer. Apple Macintosh computers serve as the primary data entry device and are now located in administrative offices throughout the district.

Several years ago, when the district decided to purchase an IBM System 36 to provide the Business Office with financial, general ledger, and payroll accounting support, Texas Educational Consultative Services, Inc. (TECS) was selected as the software provider. Primary considerations for the selection of TECS products were: compatibility with the System 36 architecture; installation, training, and on-going support; timely and accurate maintenance of software to reflect changes in TEA reporting requirements; ease of use; and cost.

Later, when the district elected to expand use of the System 36 and computerize additional administrative services, naturally, TECS software was considered first. Today, the RISD licenses a variety of integrated software packages from TECS in addition to the original fiscal management modules. Services provided include: Student Accounting (attendance reporting/accounting, including the generation of official TEA reports and documents), Grade Reporting, Scheduling, Personnel, Fixed Assets, and PEIMS.

In considering hardware for the proposed expansion of computer services, requirements for ease of use, reduced training time, extended capabilities, and versatility all pointed towards purchase of Apple Macintosh computers and accompanying peripherals. The Macs communicate with the System 36 while operating in IBM 5250 terminal emulation mode using S/3x Link software in conjunction with Series II Twinax protocol converters manufactured by KMW Systems, Inc. The protocol converters connect directly to the System 36 using standard twinaxial cable, while local Macs and terminals are hard-wired to the Series II protocol converters using standard unshielded four-conductor cable installed by the district's own maintenance personnel. Computers located at remote sites (4 campuses) reach the System 36 through use of point-to-point telephone lines. Instead of modems, asynchronous line drivers connect both the local and remote computers/terminals to the PC side of the Series II. Remote sites operate at 9,600 baud with no difficulty, while the local units function well at 19,200 baud due to their proximity to the mini-computer.

Installation of all equipment and the training of personnel occurred during July, 1987. Within two weeks all campuses had built student and family files, scheduled teachers and students, and established procedures for the opening of school.

Hardware/Software Sources

Apple Computer Hardware:

Sandra K. Pratscher
Apple Computer, Inc.
Building 4 Suite 400
9430 Research Blvd.
Austin, TX 78759
512-343-4533

Bill Hansen
Apple Computer, Inc.
2950 North Loop West
suite 1070
Houston, TX 77092
713-682-3200

KMW Systems Corporation
Beverly Stevens
100 Shepherd Mountain Plaza
Austin, TX 78730-5014
512-338-3000

General Telephone Company(GTE)
Vernon E. Couch
8988 Kirby Drive
Houston, Tx 77054
713-662-5143

TECS, Inc.
Eugene M. Hayes
1005 East St. Elmo Road
P.O. Box 18898
Austin, TX 78760
512-443-4433

INMAC
INMAC, Inc.
P.O. Box 890702
Dallas, TX 75389

DESIGNING A SCHOOL OF THE FUTURE - Guidelines for Administrators

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A description of a step-by-step approach to integrating computers into a large urban middle school. It is based upon the experience gained from the implementation of the School of the Future Project, a cooperative development effort between the Houston Independent School District and Apple Computer, Inc. The objective of the project is to infuse computers into a middle school curriculum and discover the differences they make in the educational process. The project began in 1985 with the loan of 200 Apple IIe's and 10 Macintosh computers to F. M. Black Middle School and is currently in full operation.

F. M. Black Middle School is the site of a cooperative development effort between the Houston Independent School District (HISD) and Apple Computer, Inc. This project is known as the School of the Future. Its purpose is to infuse computers into the curriculum and discover the differences they make in the educational process. The project began in November of 1985 with the arrival of 200 Apple IIe's and 10 Macintosh computers to the school building.

The use of computers was strictly voluntary. The project emphasized a grass-roots approach, and it had the complete support of the school's teacher technologist and principal. A full-time coordinator was also assigned to the school. HISD's Department of Technology provided support in the form of hardware, software, and personnel.

Distribution of Hardware and Software--Equitable distribution was essential. The project had been introduced to the teachers in the spring of 1985. The teachers who were the most interested in computers were identified at that time and became the core group of users. The majority of software supported the reading and mathematics curricula. Other software supported science and social studies.

Staff Motivation--The core group of teachers was trained first. They represented the major subject areas and were perceived as leaders in the school.

Training--Training took place mostly during teachers' preparation times and emphasized the following subjects:

- Hands-on
- Word processing: personal and instructional applications
- Data base: personal and instructional applications
- Computer-assisted instruction: for each major content area
- Classroom management
- Lab management
- How to use technology for a better teacher appraisal

The training was made as flexible as possible.

General Instructional Approach--Prepackaged commerical CAI software, which had been district approved and teacher selected, initially was used for instruction. As students and teachers became more comfortable with operating computers, applications-based instruction was implemented coupled with innovative, teacher-created lessons and materials. These ideas were shared amongst all of the teachers. The sharing of resources began to involve neighboring schools, as the information acquired was disseminated to other schools in the district via conferences, reports, and video.

The New and Improved, State-Developed, Mini and Micro-computer Administrative Software

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Doris Slay-Barber, Coordinator
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The Regional Service Centers Computer Cooperative (RSCCC) and Education Service Center, Region 20 (San Antonio), with the cooperation of Texas Regional Service Centers, the Texas Education Agency and local school districts from throughout the state, developed what is considered the most modern and easy to use micro-based computer software available for Texas school districts. Participants will be provided with background information regarding the history and current participation in the RSCCC. An overview of the business and student software will be presented and sample reports will be provided to participants.

I. Regional Service Center Computer Cooperative (RSCCC)
   - A. History
   - B. Funding
   - C. Participants
   - D. Software Development

II. Software Features
   - A. Business
     1. Finance
     2. Payroll
     3. Fixed Assets
     4. Tax Collection
     5. Budget
     6. Personnel
     7. Advanced Academic Training
     8. PEIMS
   - B. Student
     1. Registration
     2. Grade Reporting
     3. Attendance Accounting
     4. Student Scheduling
     5. Special Education Management System (SEMS)

Using The Macintosh in School Administration

By Dr. Kent S. Cochran, Education Support
Apple Computer, Inc.

Abstract Of Presentation

This presentation will give some practical advise to the school administrator who wants to increase productivity on a daily basis. Dr. Cochran will share many of his ideas and examples of how he used the Macintosh while serving as principal of a large middle school.

Computers in the principal's office are becoming more and more necessary as paperwork loads increase for the principal. Personal computers, as an extension of oneself, are allowing principals to accomplish more work in shorter amounts of time.

Dr. Cochran, 1986-87 principal of Northwest Middle School, used the Macintosh to do such things as attendance, discipline reporting, teacher appraisal, budget, and many other things in his school. Kent will share with the participants the software programs used and how each of the task were set up.

Microsoft Works was the primary program used to do budgets, student letters, and other word processing projects. Kent used programs to develop student calendars that were up to date with the latest information. Kent also published two newspapers in his school. First, the student newspaper which had students articles. Second, the teacher newspaper that allowed the teachers to brag on one another and of kids that were doing great things on the campus. Kent only allowed articles of a positive nature in this newspaper This was a real winner with teachers and was done in a matter of a few minutes each week with the use of the Macintosh and Pagemaker.

Dr. Cochran's school was also a pilot site for MacSchool, an integrated school administrative system for schools of all types and sizes. It handles a school's student record management needs and is designed to run on the Macintosh Plus with a 20 Megabyte hard disk. Reporting options are comprehensive and include student academic progress, disciplinary action, transcripts, honor roles, and student, school, and teacher timetables. All reports and summaries can be formatted to suit individual school requirements.

This presentation promises to be informative and entertaining. Come get some good ideas to take back to your school!

A GRAPHICS UNIT FOR INTRODUCTION TO COMPUTER PROGRAMMING

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The purpose of this presentation is to present a brief description of how a computer graphics unit can be taught. Computer graphics is part of the Introduction to Computer Programming in BASIC course offered to ninth graders for one semester in the Lubbock Independent School District. Ideas and materials for computer graphics will be discussed.

Graphics is taught so that students work with graph coordinates, color, and sound. Using these skills, students develop their own graphics program. Students can use their creativity and imagination to write these graphics programs. This unit is interesting and fun for both the teacher and the student.

This presentation will provide materials and ideas for teachers who have never taught computer graphics before, and at the same time, experienced teachers will be able to share their ideas with each other. Several different graphics programs will be shown, from the very simple to the very complex. Color and movement will be discussed. There is no limit as to what one can achieve once the basics are learned and a little imagination is used. Computer graphics is fun!

COMPOSITION APPROACH TO WORD PROCESSING

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The ability to compose business letters, manuscripts, messages is an essential skill for all future business leaders. They must be able to think and key information quickly. If the word processing unit is taught from the composition approach, the students will see it more as a tool instead of a substitute typewriter. It would eliminate the need for pen and pencil rough drafts--thus saving valuable time. A side benefit to this unit is improved English skills. I propose to share the unit of study that I have prepared for word processing from the composition approach.

COMPUTERIZED DRILL PROGRAMS FOR ACCOUNTING: DO THEY WORK?

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ABSTRACT: Accounting students must learn a large number of definitions, concepts, and rules within the first few weeks of the semester if they are to be able to understand the accounting that follows. Because this knowledge is not related to prior learning and has not been learned over a period of years, many students needlessly struggle to learn any accounting beyond this point. Computer-assisted drills may be the answer if they provide drill that will help the students "automatize" the basic facts and rules. Research has shown that software of this type can improve the performance of all students, with as little as 30 minutes per week drill. Though there are currently no programs of this type on the market, there is an increasing number of publishers willing to produce accounting drill software. It is up to the accounting educators to specify the content and importance of drill software.

As a rule, drill and practice is one of the first things for which most disciplines use a computer. Accounting, however, has been an exception. After more than twenty years of computer-assisted instruction, there are very few drill programs available in the accounting area.

What about all of the talk of "computerizing" accounting? Almost all of the "computerization has been in the integration of general ledger systems in which students input their journal entries and print their ledgers and reports. While this aspect of computers is certainly important to the field of accounting, the use of the computer as an aid to instruction and an aid to learning has been neglected.

To date few accounting publishers have offered a computer component to their textbook beyond the computerized general ledger system. Of those who did, the practice consisted of a limited number of classifications, multiple choice, and journal entry exercises. None of them provided the means to offer students a drill in, for instance, classifying accounts until the student (or the teacher) was comfortable with the level of mastery.

Why should we use drill in accounting? Like most fields accounting has a large number of facts and rules to be learned early in the course. However, unlike most other topics, accounting is fraught with new concepts. Few students have heard of a debit or credit or an asset or liability prior to their first accounting course. So while biology, for instance, also may have a large number of facts and definitions to memorize, these new facts can be related to knowledge which the student already has. Math, on the other hand, has a large number of rules, but these have been learned over a period of years, rather than within a period of weeks. In accounting, a lot of definitions, concepts and rules must be learned very quickly so that accounting can become meaningful and useful to the students. It is at this point that we lose many students by not providing enough practice on the basic definitions and rules.

As an example, let us look at a simple two-account journal entry in terms of the amount of human working memory it takes to process the entry. First, the learner must determine which two accounts are involved (2 bits of information). Then she must determine whether each is increased or decreased (2 more bits of information). Next she must recall the accounts' classifications (2 bits) and based on their classifications, determine whether the increase or decrease is a debit or credit (2 bits). She must also keep the amount of the transaction (1 bit) in mind. She now has 9 bits of information in her active or working memory Research has shown that the average working memory capacity is 7 bits plus or minus 2; so she is approaching overload with just a simple journal entry. What happens when she has a journal entry that involves three or four accounts, with different amounts for each account?

Drill and practice exercises in accounting can help reduce this problem by providing students the opportunity to learn concepts to the level of "automaticity". Automaticity is a combination of speed, accuracy, and the ability to "know" something well enough that you can do something else while you provide the information. For most of us, adding two plus two is done at the level of automaticity. We don't have to stop to count or consciously add the numbers; we know the answer. Likewise, writing is automatic. For good typists, typing is automatic; indeed, they can carry on a conversation while they type.

Knowledge that has been practiced to the level of automaticity takes much less working memory. Thus, if a student "knows" that Cash is an Asset, she doesn't have to think "what is the classification for Cash?". Further, if she has learned that an increase to Cash is a debit, she takes up even less working memory. So in the two-account journal entry example used above, the student would use only 5 bits of working memory. Therefore, the role of drill in accounting is to provide the means for students to learn the basic facts and concepts to the level of automaticity so as to improve their achievement in accounting.

Again, the current accounting materials fail on this point. In a survey of fourteen college textbooks for beginning accounting, there was an average of 56 exercises and problems provided for the first complete accounting cycle. While it would seem that students were provided with a large number of practice items, they only 25% of the exercises provided the type of practice required to "automate" the basic knowledge they would use throughout their accounting career.

Can computer-assisted drills provide the needed practice in accounting? In a research study completed in the Fall of 1987 using University first semester accounting students, a computer-assisted drill program was developed that provided practice on the classification of accounts, increases and decreases to these accounts, and adjusting entries. Students spent an average of 10 minutes three times a week over the first five weeks of the semester. Scores for these students on the first course exam, which covered the complete accounting cycle, were compared to the scores for students who had not completed the drills. The average score for students who completed the drills was 12 points higher than those not doing the drills. The drills proved particularly valuable for students who had scored in the lowest quartile on the pretest; they were able to raise their scores so that they were equivalent to those earned by the students who had scored in the top quartile on the pretest. In addition, there was a significant correlation of the first course exam scores with students' achievement on the drills. These results indicate that students completing even a few minutes of drills each week show an improvement in their course achievement.

What is the future of drills in accounting? As accounting educators we must begin to insist that publishers produce accounting drill programs that will provide the type of practice needed to help our students reach the level of automaticity. We should identify those definitions, concepts, and rules that should be the first to be computerized so that publishers will know the direction we want to take. Finally, we must provide time within our class outline to give students practice on these basic concepts.

dBASE III

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The purpose of this presentation is to introduce you to the number one database system being used in the marketplace today. dBASEIII is the best data management tool I have seen and utilizes applications programming. Students are employable with dBASEIII skills while they are not with some other types of programming languages or database knowledge. It also enhances their college level computer skills.

Teaching COBOL is very rewarding and very interesting, however, after teaching this to high school seniors, I feel our public school courses should be more in line with computer opportunities and needs in the marketplace.

The basic input-process-output concept is necessary in all programming languages just as program logic. Students should be able to define the flow of logic for a program regardless of the language; BASIC, COBOL, or dBASEIII.

Data files are often difficult to understand. Students have to write a program to build a data file in order to fully understand data records and fields. dBASEIII provides a very detailed system of defining fields, inputing records and changing or adding records. One set of data may also be used in several different programs.

dBASEIII provides a system of 13 different files that can be used in many different ways. Once a file has been defined or set up, data can be reported using that report form or text output file with most any data file.

dBASEIII increases the possibility of what data can be reported, how it can be presented, how the data can be manipulated and how it can be used with other programs.

The dBASEIII presentation will:

I. explain the 13 types of files and give student handout examples for each phase of the file preparation process;

II. explain, with actual student assignment sheets, the various types of dBASEIII reports; and

III. explain the applications programming process. Program samples and suggestions will be included in the presentation packet.

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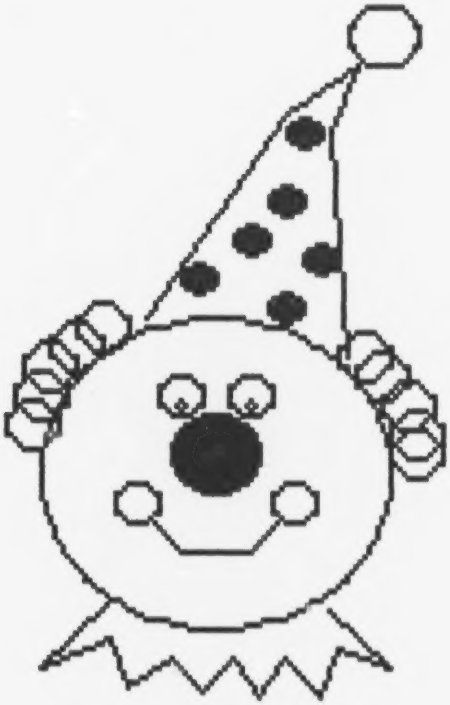
INTRODUCING YOUR STUDENTS TO PC GRAPHICS (MS-DOS VERSION)

This presentation is designed for high school BASIC programming teachers who would like to include the exciting topic of graphics (medium-resolution) in his/her curriculum. Graphics statements such as SCREEN, COLOR, LINE, CIRCLE, PSET, PRESET, and COLOR will be explained and illustrated. Preparing the printer to print graphics will also be addressed. A number of sample programs will be presented and illustrated. No prior experience in programming graphics is necessary. The first 40 arrivals will receive a booklet and sample programs that will be used during the presentation. If a picture is worth a thousand words, shown below is a student design following one week of instruction.



Swap Shop on BASIC

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ABSTRACT:

Everyone looks forward eagerly to attending a conference to be able to bring home new ideas to use in the classroom. Swap Shop will give each one a chance to exchange successful programming ideas, tips, hints and even vent a few frustrations in teaching BASIC programming. Hopefully each participant will find at least one "spark" to take back to the classroom.

Program 5 is a successful programming assignment which has been used in teaching ninth grade students in the Introduction to Computer Programming course. Its name is derived simply from the fact it is the fifth programming assignment of the semester, but its number becomes more significant because it actually is four different assignments which build upon the BASIC concepts as the semester progresses.

The first version of Program 5 comes after the study of numeric and string variables. It is very important to structure this first assignment to leave room in the program for future changes. This program consists of 10 mathematical formulas, such as Area of a Triangle, Circumference of a Circle, Area of a Circle, Interest, Volume of a Sphere and Changing Centigrade to Fahrenheit. Each formula has a specific value given to each variable.

Each formula becomes a section of the program complete with REM statement, title, variables and a good PRINT statement giving the correct output. In order to see the output of each section a delay loop is introduced at the end of each section.

Students are surprised and pleased that they are able to write such a "long" program as one of their first assignments.

Program 5 is then revised after the study of INPUT so that the formulas can be used more than once if needed. Each variable which might change in the formula is changed to an Input statement. This revision also requires corrections of all previous mistakes, rounding each output to hundredths and the addition of better spacing on each screen in a section.

After each version of the program a listing on the printer is turned in for grading and marking of mistakes.

The next revision comes after the introduction of conditional branching. Each of the 10 sections is revised to allow the user the option to run that section as many times as necessary. Also included is the addition of error traps and the correction of mistakes.

The last and final revision adds a menu to the program. Each of the sections then becomes a subroutine. All corrections are made and the entire program debugged to make one " longer" good program.

By carring this one program throughout the semester course students are able to structure a BASIC program piece by piece and most are amazed at how much they really can do.

Teaching Computer Programming:
Input the Positives, "Kill" the Negatives

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This paper poses the challenge to high school teachers of finding ways to create a "positive" learning environment in Computer Programming classrooms . To seek more effective methods of instruction is to gain "positive" learning results rather than "negative" ones. Specific areas requiring attention and response are given, including innovative delivery of our presentations, an enthusiasm toward the subject matter, and an increased endeavor to keep our subject matter close to students' interests. Any of these are strategies which could be used by teachers of programming and could enhance the learning of the student in the Computer Programing classroom. To INPUT THE POSITIVES and to "KILL" the NEGATIVES may be one way of gaining more excellent results which teachers all desire.

In BASIC Computer Programming terminology, to "INPUT" means to enter data into the computer so that it can be processed and become useful information; to "KILL" means to delete certain files which have been saved on the diskette and which are not now useful.

In order to be able to teach Computer Programming as effectively as possible, I firmly believe that we, as teachers of the high school student, must strive daily to give him/her the proper data to "INPUT" into his/her own "computer memory" which will result in the *positive* output of learning. On the other end of the continuum, it seems logical, therefore, that we should attempt to help to delete and "KILL" all possibilities for *negative* results. INPUT THE POSITIVES AND KILL THE NEGATIVES.

As I observe my five Computer Programming classes I see at least one student in each section struggling to grasp the understanding of a new idea, or trying to master application of a previously learned concept. As I observe, my interest and my curiosity begin to grow , and I find myself wanting to research the "why's" of the students' individual abilities to either grasp a new concept easily and to feel *positively* toward the learning of the computer or to fail to understand and to feel lost, confused , and *negative* toward that learning situation. This negative feeling projects even further as I have had students who--at points of utter frustration--stop trying to learn or want to quit the course altogether.

WHAT CAN WE AS TEACHERS DO? There are several strategies we can try in the classroom . Of course, we know that not one strategy will work for all the students all the time, but I feel it is imperative that we try to make as many successes for the student as possible through our teaching of Computer Programming. These successful learning experiences will ingrain in a teenager a deeper faith and confidence in himself or herself. The student then tends to begin to think as a winner (positively) instead of as a loser (negatively). One way of accomplishing this attitude might be to explain, to demonstrate, and then to allow the student to have imnmediate "hands-on" experience when presenting a new BASIC command or statement.

Let's say that we are presenting a unit on the use of the FOR and NEXT statement in a program. I would begin by giving key terms, an explanation, transfer from previous learning, and then demonstrate on my classroom overhead monitors several ways the statement can be used in a program. I like to tell the students at the beginning of a presentation all the advantages for using this new structuring tool. (At times, I/we may have to "make up" a few advantages.) I would present a "revised" program which they had worked previously. I might use the new FOR and NEXT loop in place of a GOTO loop. (In BASIC instruction, we want to move away from the GOTO loop as soon as possible, so, this example serves more than one purpose.) I would try to relate to the students' interests and create a demonstration program using the SOUND statement of BASICA. If you try something like writing and demonstrating a program using a FOR and NEXT loop which sounds like a police siren, you may have the students "hooked" forever.

Another invaluable hint for Computer Programming is ENTHUSIASM! I believe it is contagious, and I believe it works in the classroom!

Is it possible to learn a new programming concept in one class period? I believe it is! Can we "master" it within a short period following presentation? I believe we can if we use methodology which will "INPUT" the positives and "KILL" the negatives.

Perhaps one of the most accurate measures of learning in our classrooms might be obtained through listening to our students' comments. We hope to hear, "This class was easy today!" Is this statement gratifying? Yes! Especially if a more advanced concept was presented! If you hear this in your classroom, you may think it was because of a coincidence or maybe the student(s) overheard were just having an especially good day, or maybe you were too easy during class. None of these would have to be the case if you had tried to teach the positives and worked hard at eliminating the negatives by convincing the students that learning Computer Programming is not impossible and it does not have to be the "dreaded" class of their entire high school career! I truly believe that our classes become what we think!

Let's work--beginning today--at "INPUTING THE POSITIVES AND KILLING THE NEGATIVES."

TEACHING WORD PROCESSING IN THE BUSINESS CLASSROOM

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This presentation is designed to present materials and activities used in teaching word processing to students in Data Processing I and Data Processing II. These activities can be used with any piece of word processing software and can be adapted to other classes where word processing is used.

Word Processing is the one application skill that students use the most. After the students have mastered word processing skills and because of the apparent benefits of this communication tool, it is used periodically throughout the class for tests, reports, letters, projects and more.

In learning word processing the students will do activities in the following areas:

1. Disk handling
2. Proper keyboarding (for beginners)
3. Booting up the word processing disk
4. Use of the data disk
5. Opening a file folder
6. Creating and naming a document
7. Cursor movement within a document
8. Using various modes such as: character, word, paragraph, page, and line
9. Inserting and deleting in various modes
10. Adjusting copy
11. Saving documents
12. Retreiving documents
13. Deleting documents
14. Setting a ruler (or margins)--justifying the right margin, setting a tab, line spacing, character size
15. Centering a line
16. Printing documents
17. Underlining
18. Cutting & Pasting words, lines, paragraphs, etc.
19. Searching & Replacing words and phrases
20. Paginating
21. Highlighting and other fonts
22. Tagging & Merging
23. Page parameters
24. Spell checking
25. Graphics

Upon completion of the word processing learning activities the students will be given projects to put these skills to use. Examples of projects are: creative writing; researching a topic, typing it and organizing it on the word processor; and using a typing book or word processing book for selected projects.

The activities can be easily made by using magazine articles, newspaper articles, and library books.

During this presentation, I will share a packet of learning activities that can be adapted for any computer or used with any piece of word processing software.

Animated Low-Resolution Graphics

Pamelia Paddock and Jerry Ivy
Abilene Ind. School District

Ever since the premiere of Mickey Mouse, people of all ages have been fascinated with animation. Now, using low-resolution graphics, your computer lab can be transformed into a mini-Disney studio, with your students using creativity and imagination which prior to this unit may have been un-tapped.

During our presentation, we will demonstrate the Draw/X-Draw techniques which create the illusion of simple movements such as hands waving, eyes blinking, etc., as well as variable plot commands which allow actual movement of graphic images from one side of the screen to the other. We will demonstrate simple routines which change background colors, create sky/earth effects and we will demonstrate the use of for-next loops to create segments of a program which move.

We will demonstrate how plotting a simple moving dot can create the illusion of wheels turning, cars driving down a road or horses racing by a fence.

In our presentation we will show several examples of actual student projects using low-resolution graphics animation.

At the end of our presentation, participants will receive handouts and they may obtain a copy of the animated projects program which we will be using. (Be sure to bring a blank floppy disk to the presentation. Sometimes the easiest way to understand how a program works is to list the program and see- therefore we encourage participants to use our projects in their classroom as a teaching tool.)

We will begin our presentation with a brief explanation of how we introduce our unit on BASIC programming by teaching the beginning commands from PRINT through IF-THEN and FOR-NEXT loops. At that point we assign our students to design an electronic billboard project where they create an advertisement similar to those found on our local t.v. station's electronic B-Board service. The natural creativity and competitiveness begin to emerge as each student works to make his/her project more creative than anyone else's. At this point, students usually are not satisfied with just the special effects created by the use of FLASH and INVERSE and they begin asking questions such as "How can I make this move?" We suggest the beginning of what has proven to be the magic combination: Draw/X-Draw routines and students are off on a quest in which their imagination and our ability to teach programming are the only limitations.

At this point, we have not covered conditional branching using subroutines as we prefer to "sneak" it in by showing students "an easier way" to accomplish their ideas.

Generally, during the Billboard project, the use of FOR-NEXT loops is limited to a timed loop which creates a pause for the text to be read prior to clearing the screen with the HOME command, or prior to the appearance of additional text on the screen.

It does not take the students long to have a clear understanding of all the BASIC statements and commands including INPUT and IF-THEN as they use these commands to create the effects for which they are striving.

With the completion of the Billboard projects, it is time to introduce Low-Resolution graphics. We begin with GR,HLIN,VLIN and PLOT as well as Color =. We assign a fairly simple, high interest project that everyone in each class is able to complete in 2-3 class periods. Everyone is successful and once they see how easy it is to program designs in low-res., they are eager to do an original design, especially when we show them some examples of how their designs can become animated.

For the animation projects, we assign a single theme such as "Winter" for all classes. This past semester the theme was "A Salute to Disney". The year of the Sesquicentennial, we used the 150th birthday of Texas for our theme. Everyone in each class is free to create their own design in keeping with the assigned theme, but for those who have yet to discover their artistic ability, we provide coloring books and an assortment of patterns which can be traced onto graph paper by using an overhead projector. (We find only a few who do not develop their own design from ideas they find outside class.) Students are allowed to work in pairs and each is required to prepare a design on graph paper. Some even come in with their designs colored with map colors to help them determine color changes as they program. We suggest that they write their program on paper prior to keying it in just to save classroom time, however, some prefer to program "straight" from their graph paper.

As the project develops, the students suggest ideas for what parts of their design will ultimately move and we help them individually with the programming segments to create the animation. We find that almost each type of movement differs from the next, and the Draw/X-Draw segment can vary depending on whether the movements are simple or complex.

The most frustrating problems we have encountered are those created when the student wants everything to move-all at one time.

Creating an animated lo-res graphic project can be the highlight of computer literacy. Join us and share the fun of creating animated lo-res!

APPLEWORKS

An integrated curriculum for an integrated program-

by Ellen Joslin
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At McCulloch Middle School in Highland Park, as part of the Computer Literacy course, we teach all of our seventh grade students to use Appleworks. Word processing is taught with Language Arts lessons; Social Studies information is used to teach Data Base; mathematical problems are used to teach Spreadsheet. The boys and girls are thus given a tool that is currently being used all across the curriculum.

Computers are tools. To encourage teachers to perceive the computer as a useful tool in their subject area, it is necessary to provide the students with the competencies required for subject area use. We teach Appleworks because it provides our students an easy-to-use tool for word processing, data base management, and spreadsheet analysis.

To make the link between word processing and Language Arts we teach editing using a homophone exercise , a parts of speech exercise, and a madlib type exercise. The eighth grade Language Arts teachers make full use the word processing skills which are taught in seventh grade Computer Literacy classes. Due to ease of revision, the compositions done in the computer lab have fewer errors. The teachers appreciate that the printed material is easier to read and easier to grade. The students are justly proud of a sleek presentation. Our school newspaper is produced by eighth grade students using Appleworks.

The spreadsheet provides a wonderful way of answering 'WHAT IF?' questions. Students use a grade spreadsheet to quickly calculate "What if I raised that zero to a seventy?" (Most students don't know how devastating a single zero can be to an average!) Most math teachers dread the introduction of compound interest. The formula for calculating compound interest is complex and very susceptible to error. Using a spreadsheet, to demonstarte the growth of savings as interest is accumulated and compounded, clarifies thinking. It is the perfect example of using the computer to teach a concept.

The Appleworks' Data Base helps you work with information you usually keep in lists. We choose to teach Data Base with a list of Presidents. Students organize the Presidents alphabetically and chronologically. They quickly learn to find a record using a single key word. Surprisingly, the boys and girls enjoy narrowing a search by choosing a category, choosing a method of comparison, choosing a connector (AND, OR), choosing a second category, and choosing a second method of comparison. We feel that the time spent learning to use the Presidents Data Base is doubly well spent; the students not only learn something about Data Bases, they learn something about the history of the United States.

Students, who know what a computer can do and are capable of making the computer do what they want it to do, are ready to use the computer as a tool. As we teach Computer Literacy, we try to demonstrate the versatility of the computer by linking our curriculum with the curriculum in Language Arts, Social Studies, and Mathematics.

Appleworks™: Teaching Computer Terminology and History Using its Data Base

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One of the difficulties of teaching computer literacy is due to its being in constant change. We have real problems keeping ourselves as well as our textbooks current. We do not have the money to buy the necessary materials even if they were available.

Teacher labor is cheap, however, and student labor is cost-effective, if for no other reason than because it is free. **Appleworks™**, Apple's integrated data base, word processor and spreadsheet, is probably the most cost-effective piece of software ever written for a computer. We use it to calculate grades, write tests, keep the inventory, write our lesson plans and write out individual progress reports (or, more often, write out "lack of" progress reports.) If we had more memory, we could do teacher and student scheduling.

Two years ago, my seventh grade computer literacy students and I began to develop a set of data files for use for use in teaching seventh-grade computer literacy. The first materials produced were a computer dictionary file and a history file. The dictionary has now reached the 55 kilobyte limit of the Appleworks desktop. We continue to revise it, correcting errors and changing definitions as necessary. The history file continues to grow.

Helping Students to Understand the Words

The "**Computerese**" dictionary is especially useful the first few days of the course, when we have to introduce so many technological terms. We also have to get a diverse group of students off to a good start. Even before they have even been told how to turn on the machines or how to load the software, students are introduced to the Appleworks data base. We do this for several reasons:

- Students who already have some experience with computers are less likely to be put off at the beginning of the course, because they probably don't know any more about data bases than anyone else. Everyone has an equal opportunity to learn that a computer is a tool which we can use to make our work easier.
- While most of the terms may be defined in the normal "dictionary" sense, the computer also looks them up in context. Students can see how the words are actually used, as well as how they are defined.
- Most students find that they would rather consult the computer than use the index in the textbook, because the machine is easier, faster, and often more appropriate.
- We as educators (if we are any good at all) occasionally disagree with the textbook. I like to have my students learn my definitions rather than (or along with) those of the book. It is significant that students reading information off the screen are much more inclined to accept and believe it. It may be that the computer has more credibility than we. Of course, the majority of our students may be "visual" learners simply because today we get most of what we absorb from television.
- Students have an opporunity to learn the real importance of electronic-based information as compared to information on paper. Electronic data bases are easy

to correct. While the textbook will continue to engender error year after year, we continually rewrite our definitions as our words and our needs change.

Helping Students to Understand History Better

The "**CHst.People**" file is a chronological listing of technologically important events and people, particularly as they relate to computing. It may be argued, that with all the material which we must cover in this one semester course, teaching computer history is a waste of time. Data base management systems, on the other hand, probably will be second only to word processing in importance in the next ten years. Using a data base, therefore, as a tool in teaching history allows us to spend more time on the data base, and we are thus able to our use classrom time more effectively. When the students actually write their own data bases later in the course, they will already have experience working with them.

One very important concept the students learn (and this is may be a very good argument for teaching computer history) is that **technological progress increases geometrically.** With the event listed on the left and the year of its occurrence on the right, we can easily see that things began to happen rapidly in the seventeenth century, with eight significant events listed, to twenty-one in the nineteenth, to twenty-nine the first half of this century. We find that more than half of the significant technological events in our list have occurred since 1950.

When we teach history using our own data base, we have the advantage of reinforcing our own version of it. Whereas the usual reference work might note that Ada Lovelace was Byron's only legitimate child or that Pascal was gay, we chose to emphasize details which might be more electronically meaningful. We can also correct and add to the file as necessary. It was easy, for example, to add the recent development of the parallel processor "fifth-generation" computer.

Appleworks is easy to use, although fairly complicated to load with its PRODOS operating system, but it is "menu-driven." To use the data base for reference, we need only be able to use these commands:

"open-Apple" F	for "**Find**" (to find a particular term)
"open-Apple" Z	to "**Zoom**" into and out of individual records ("toggle between a list of the records in which the term is found to the individual record)
"open-Apple" Y	to **erase** the old term for which we were looking before we type in the new one
"open-Apple" ?	If we forget any of this, provides on-screen **help** (provides a list of Appleworks commands)

These materials are useful to us in teaching computer literacy, and are helpful to our students in terms of both basic knowledge and enrichment. We sincerely hope they may be of value to you. Please feel free to copy, to add anything, delete anything, or correct these files to fit your needs. We would appreciate your help in improving either.

Computer Literacy in Grades 5 and 6: Meeting the Challenge of Chapter 75

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The Conroe Independent School District has a desire and need to provide instruction in computer skills and computer utilization for the students in its intermediate schools in a consistent and planned manner. To meet this challenge, CISD developed a curriculum of skills that addresses the essential elements for computer literacy in grades 5 and 6. This curriculum provides a broad foundation of computer skills based upon the five major components of computer literacy suggested by TEA. This curriculum also helps to prepare 5th and 6th grade students for a successful experience in the Junior High computer literacy course.

Unit I: Computer Readiness

1. Students will be introduced to the computer by being made aware of computers in their immediate environment.
2. Students will be introduced to the parts of the Apple computer system.
3. Students will be introduced to computer terminology.
4. Students will be introduced to the procedures required to safely operate the Apple computer.
5. Students will be introduced to the Apple computer keyboard and its functions.

Unit II: History and Development

1. Students will be introduced to a brief history of the development of computers.
2. Students will identify the three types of computers: mainframe, minicomputer, microcomputer.

Unit III: Computers in Society

1. Students will identify the use of the computer in their immediate environment and in society.
2. Students will identify computer related careers.
3. Students will identify the issues and potential solutions pertaining to the illegal use of the computer.

Unit IV: Using the Computer as a Tool

1. Students will be able to use the computer and selected programs independently, following the correct procedures.
2. Students will be able to interact with software in a variety of applications, especially computer assisted instructional (CAI) software.

Unit V: Elementary Programming

1. Students will write a sequenced set of instructions.
2. Students will be introduced to Apple LOGO.
3. Students will learn that a program is a detailed set of sequential instructions telling the computer what to do.

   Students will write or copy a simple BASIC program and, if possible, type it into the computer and run it (error free).

For each skill outlined above, there are parameters which differentiate between 5th and 6th grade skills. For each skill, there is a list of Material Resources and Suggested Teaching Activities. No tests have yet been developed, but criterion tests may be written later.

COMPUTER LITERACY SOFTWARE

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This workshop will present software programs which may be used to enhance the curriculum of computer literacy. Each program will be coded to the essential elements. In addition, hints and suggestions will be given concerning the utilization of these programs. A handout outlining this information will be available to participants.

Software for the following topics will be discussed:

Introduction to computers

Keyboarding

Use of the computer as a tool

Basic programming

Problem solving

Terminology

History

Time will be made available for participants' input concerning software packages that they have found to be effective in their computer literacy program.

CREATIVE LO-RES

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The creative Lo-Res session will demonstrate the creative work of many Junior High students. Computer graphics has given students, as never before, the ability to create. Programming with computer graphics is an educational experience that makes it possible for students to see things that they have only been able to imagine. By using only a few commands, their efforts are rewarded with drawings and designs on the computer screen. They learn the process of writing a program while enjoying the satisfaction of the visual results. As the proverb goes, one picture is worth a thousand words. These pictures express the creative imagination and individuality of each unique student.

Karel: A Robot Programming Language for Computer Literacy

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The Karel the Robot programming language is ideally suited for computer literacy instruction. It is a small, easy to learn, highly motivating language which requires no mathematical sophistication. In addition, its syntax is identical to much of the syntax of the Pascal programming language, providing for an easy transition for students who go on to study computer science.

One of the five essential elements in the computer literacy course required of all Texas junior high school students is "Communicating instructions to the computer", or, learning the syntax of a high level language. Meeting this essential element is a difficult task. Students at this level have very limited mathematical skills which severely limits the type of programs which may successfully be written in most programming languages.

BASIC is the most widely used programming language in computer literacy instruction. Like most high level languages, programs in BASIC generally involve the manipulation of variables which is a difficult concept for students who have not been exposed to algebra. In addition, since computer science instruction at the high school level uses Pascal almost exclusively, computer literacy students who go on to computer science courses in high school often have difficulty making the transition from BASIC to Pascal.

The main concepts of programming can be taught in the LOGO programming language without the use of variables, using the 'turtle graphics' feature of the language. However, the vast conceptual differences between LOGO and Pascal may hinder students who later study Pascal.

The Karel the Robot programming language seems ideally suited to the computer literacy course. The language is small, containing only five primitive instructions and four basic control constructs (IF-THEN, IF-THEN-ELSE, WHILE loop, and FOR loop), and it is fun. The Karel language is used to direct a 'robot' within his 'world'. The world is a 2-dimensional grid of 'streets' and 'avenues', which may contain walls, through which the robot cannot move, and objects called beepers. The robot is able to see the walls and hear the beepers, and these senses are used to generate test conditions for the decision and WHILE loop control constructs of the language. The 'world' is configured with an editor (world builder) to create a task to be solved by a Karel program. Typical tasks include the 'harvesting' of beepers, stair-climbing, hurdle races, and mazes. Since the language does not use variables, it is possible for students with no background in algebra to solve complex tasks and to become proficient in the design of structured, modular programs.

Most of the syntax of the Karel language is identical to Pascal syntax. Therefore students who go on to study high school computer science have the advantages of exposure to the techniques of structured, modular programming and knowledge of much of the syntax of the Pascal language.

MISCONCEPTIONS IN COMPUTER LITERACY

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Abstract

As computer literacy courses begin to meet the educational computing needs of preservice teachers, it is necessary to better understand what is or is not learned from such courses. Two studies were conducted with preservice teachers from the Summer 1986 and the Spring 1987 computer literacy courses at the University of Houston examining acquisition of fundamental computing concepts. The second study also examined styles of definition and explanation of the concepts. Misconceptions and confusion were revealed through one-on-one interviews, a written instrument, and hands-on observations. These studies clearly revealed that students do have misunderstandings about fundamental computing concepts which could have serious consequences for both teachers and the students whom they teach.

Teachers everywhere are seeking the training and experience in educational computing which they need to make better use of computers in their subject areas and in their lives as a whole. State mandates now require computer literacy education for both preservice teachers and junior high school students. Research is only now beginning to examine what students learn or fail to learn from computer literacy courses (Galloway & Bright, 1987).

As students learn, incoming information is interpreted and related to existing ideas, prior beliefs, experiences, and conceptions. Existing ideas are extremely resistant to change even under extensive exposure to instruction (Osborne & Wittrock, 1983). Each beginning learner of computer operations, having heard many computing terms used frequently in today's society, brings a personal set of experiences and ideas which could interfere with the acquisition of proper concepts.

Other variables which affect learning a given concept include its number of unique attributes, how the concept can be represented or defined, the subject's age, I.Q., cognitive style and more. Learning a concept is the classifying of attributes and relationships between attributes and the describing by definition and/or examples (Sowder, 1980). The unique, individual characteristics of the learner may affect how this process of classification, definition, and description occurs. This presentation outlined two studies which examined fundamental computing concepts including ways of defining and explaining those concepts.

A pilot study was conducted with students from the Summer 1986 computer literacy course at the University of Houston on Apple IIe's, examining subjects' acquisition of five fundamental computing concepts: memory, program, command, data, and file. All subjects were female volunteers between the ages 22-40. The presentation reported the design and results of this study with a summary of the subjects' misconceptions.

There were several misconceptions revealed through one-on-one interviews with each of the subjects. Procedure and program were better understood than the other three concepts. Memory was reasonably well understood. Misconceptions of file included confusion about where a file may be located as well as what a file may contain. The biggest misconception was that data is only what one types into a computer. There was confusion about what constitutes computer data. Subjects did not recognize computer generated data and did not realize that they had used data in debugging their programs.

A more involved study was conducted with students from the Spring 1987 computer literacy course at the University of Houston using Macintosh computers. Subjects' acquisition of five fundamental computing concepts (language, program, command, data, and file) as well styles of definition (by description of attributes, by example, or by analogy) were examined in this study. This study employed three data collection methods, one-on-one interviews (as in the pilot study above) as well as a written instrument (pre- and post) and hands-on observations of computing tasks which each interview subject was asked to perform. The design and results of this study were reported during the presentation in detail including examples of misunderstandings from interview transcripts.

It was clearly revealed, both during the interviews and on the written instruments, that students do have misconceptions of fundamental computing concepts. Specific misconceptions discovered during the interviews were similar to those of the pilot study. In some cases, data was thought to be preinstalled in the computer by the manufacturer. Even though program and command were the best understood concepts, commands were not sufficiently differentiated from data and applications utilities were not recognized as programs. Subjects were able to perform most of the assigned computing tasks on the Macintosh computer with little or no difficulty in spite of their misunderstandings. This was apparently due to the extremely user-friendly computing environment of the Macintosh computer.

The presentation included discussion of analogies and definitions which could explain or describe computing concepts. The importance of clear definitions and useful analogies in the acquisition of concepts was discussed. The issue of what kind of student response may be accepted as proof of concept attainment was also discussed. Misconceptions can have serious consequences for both teachers and the students whom they teach. The presentation included a discussion of such consequences as well as implications for improved teaching.

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PROBLEM SOLVING WITH SPREADSHEETS

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ABSTRACT

Problem solving with spreadsheets is a technique that helps students discover the logical method needed to solve any computer problem. For convenience, the lesson is divided into three teaching segments: analysis of the problem, practical experience, and evaluation and conclusion.

Problem solving with spreadsheets is a technique to help students discover the logical method needed to solve any computer problem. Before this technique can be successful, students should master the basic concepts and workings of the spreadsheet itself. Students should recognize the grid structure inherent in the row and column format of the spreadsheet. They must distinguish between the use of labels, values and formulas in a cell. They must be able to create formulas using cell identifications (ie. A1) instead of numbers. Furthermore, the students ought to be able to use the spreadsheet's special functions such as replicate, print in windows, and change column widths and borders.

The students are given a problem which appears to have little to do with the mathematical function of the spreadsheet. They are asked whether or not the problem could be worked on a spreadsheet. The problem has been selected to demonstrate the usefulness of one or more characteristics of the spreadsheet. A banner of the school's name, for example, can be done by using replication and printing out in an elongated window. The characteristics of the spreadsheet that would help solve the problems are discussed. Several more unusual problems are used until all characteristics of the spreadsheet have been identified and discussed. This step teaches the student to analyze the problem and find the critical characteristics which they need to use for the solution.

After the students are successful in identifying the characteristics which will be useful for the solutions of problems, they try a problem at the computers. They are instructed to read the problem. They must develop the format for the solution and put representative data in the spreadsheet in thirty minutes. At the end of the thirty-minute computer time, the students save their work. They are also required to write down all the steps they took to solve the problem. Before they leave their computers, they compare their format and solution with the other students. This comparison allows the students to realize that format is largely a matter of personal taste.

When the students return to their desks, they discuss the steps they took to solve the problem. From this discussion, a general list of logical steps is agreed upon by the students. The group consensus usually identifies the following steps as a logical method for solving computer problems:

1. Define the problem.
2. Decide what aspects are best suited to solution or presentation in a spreadsheet format.
3. Define the format for the solution.
4. Decide what labels and formulas will be used.
5. Enter the labels and formulas.
6. Gather the information needed for the values.
7. Enter the information for the values.
8. Correct and save the information.
9. Analyze the data and make any predictions.
10. Print out material in final solution.

For convenience, the class period should be divided into three segments. Each segment begins with an introduction of the skill to be used during that segment and ends with a summary of the skill used in the segment. The first segment is entitled Analysis of the Problem. The second segment is labeled Practical Experience, and the third segment's title is Evaluation and Conclusion.

SOME OF MY BEST FRIENDS ARE COMPUTERS!

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This presentation will demonstrate the following fun activities teachers can use in the classroom while teaching the essential elements for Computer Literacy in Junior High School. Activities that will be discussed in History and Development are an advertising activity, a history tree, a time line, Napier's bones, an abacus, and a punched card. Hardware activities include designing a machine, computer sorting, and playing binary code games. In the Word processing unit the amazing cursor and teaching word processing through other skills will be discussed. A fun approach to programming through writing adventure games and the egg carton computer activity will be demonstrated.

HISTORY AND DEVELOPMENT ACTIVITIES:

a. Students will create a magazine advertisement for a pre-computer machine. Students must include inventor, purpose of machine, date invented, and why it is an improvement over past machines.

b. Students will fill in the History Tree to learn the characteristics of the generations of the computers.

c. Students will put the cards of inventors and inventions in the correct places on the time line on the wall.

d. Students will cut out the Napier's bones and use them to do multiplication problems on paper.

e. Students will learn how the abacus works and do a work sheet.

f. Students will learn how to read a punched card and do a work sheet.

HARDWARE UNIT ACTIVITIES:

a. Students will design a fantasy machine that will input, process, and output a product. A student may draw a schematic of it or make a model. The object is to think logically and design a machine that will work on logic.

b. Students will learn the sorting and searching process through a demonstration of computer sorting with a deck of playing cards. The students will pick a suit and number and the teacher or another student attempts to find it.

c. Students will learn more about the binary code through the binary card activity with index cards. They will pick four questions in which they can answer yes or no by cutting out the punched holes. The teacher uses a paper clip to sort through cards.

d. Students can play the mind reading card game by guessing what number the other person picked and thus, learning the binary code system.

WORD PROCESSING UNIT ACTIVITIES:

a. Students will learn word processing by choosing a career and applying word processing skills to that career.

b. Students will learn how to use the cursor keys on the keyboard by participating in the contest. An Amazing Cursor transparency is taped to the monitor and whoever can go through the rat maze the fastest using periods with no errors wins a prize.

PROGRAMMING UNIT ACTIVITY:

a. Students will learn a fun approach to programming. They will design, flowchart, and program an adventure game. They will design a cover and write documentation for their programs.

b. For students who have trouble developing the concept of how a program works, the "Egg Carton computer activity" may be helpful. Egg cartons are used along with strips of papers to place in the cell of the carton. Different programs are tried for them to execute and record their output on the paper inside the cover of the egg carton.

FOR A VARIETY OF UNITS:

Students can learn terminology and concepts through the following games which can be used for any unit in Computer Literacy:

a. the game "I Have/Who Has"
b. the "Computer Bingo" game
c. "Concentration" game
d. the board game "Movin' On".

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THERE ARE NO IDLE COMPUTERS AT SOCORRO ISD (OR GETTING TEACHERS HOOKED ON COMPUTERS)

SANDI CARDWELL
H.D. Hilley
Socorro ISD

ELEANOR SEEBACH
M.S. Cooper
Socorro ISD

MARY ROSS
O'Shea Keleher
Socorro ISD

Because of Socorro ISD's commitment to technology, the district would like to give every student and every teacher the opportunity to use computers. Computer literacy teachers can be the resident expert and advisor by training their colleagues to effectively use computers.

With this in mind, we will provide a step by step breakdown of how to accomplish this task. We will discuss the relaxed, non-threatening, and comfortable atmosphere used in training large numbers of novice teachers district wide as effective computer users of word processing and CAI software.

OVERVIEW OF PRESENTATION

Just as the effective school says "Every child can learn", Socorro ISD is committed to the belief that every student and teacher can learn to use computers. All teachers and students should be given the opportunity to use the computer lab when computer literacy classes are not scheduled. Therefore, our focus will be to show how economically feasible it is to have a fully equipped computer lab which will be used by a wide range of student population and teaching fields. We will also demonstrate how easy it is to implement a program of this magnitude.

The following is a list of topics that will be discussed:

A. Development of basic computer knowledge.
B. Computer classroom management techniques.
C. Teaching activites.
D. Software and hardware care and maintenance.
E. Troubleshooting.
F Scheduling equal time in the lab.
G. Campaigning for teacher attendance.
H. Selection of site licensed and public domain software.
I. Producing multiple copies of site licensed and public domain software.
J. Feedback from the workshop presenters will be shared.
K. Evaluation of a district wide questionnaire of participants will be discussed.

Handouts will be provided to all participants detailing information provided during the Socorro ISD training workshops. **PUBLIC DOMAIN** software complied by subject areas will be distributed to participants of the session.

This session can be beneficial to everyone associated with education and computers. Help your district grow in the area of computer technology so you too can have a district with no idle **computers**!

The Chips Aren't Down!

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The purpose of this session is to provide ideas for teaching students to recognize the basic principles of integrated circuits and to learn about the development of the chip. Each participant will discover how chips are made, and become aware of their true significance. This program incorporates an interdisciplinary approach to instruction by implementing the following objectives: examining chips, researching the history and manufacturing of the chip, exploring electrical circuitry, creating models of the chip, and demonstrating a disk which explains circuitry.

During the session each of the objectives will be explored with an assortment of classroom samples. The participant should be prepared to get involved in some hands-on activities.

A brief overview of the history and manufacturing of chips will be covered. A selection of books will be available to preview. A bibliography will be provided. To reinforce the concept of the chip's development for manufacture, class models of chip patterns are made. If time allows one will be made during the session. At any rate, one will be on display in the room.

A sample "Discovery Box" will be explored. These boxes contain broken calculators, digital watch innards, various sizes of chips (some of which have been unsoldered to reveal the chip itself), a motherboard from a Texas Instruments' computer, a keyboard, and a magnifying glass, and other interesting electronic goodies. Thus, the examination of chips will be done first-hand.

Exploration of electrical circuitry will be done in a threefold manner. A handmade electronic "Chip Puzzle" will be tried. Patterns will be available for duplication. Participants may use the COMPUTER LOGIC LAB, a tool which teaches the principles of diodes, capacitors, and resistors. Lights indicate with both the LOGIC LAB and the "Chip Puzzle" when each is correctly worked, therefore, the feedback is immediate. ROCKY'S BOOTS, a Learning Company disk which teaches electronic circuitry will be demonstrated.

This project was developed for fourth and fifth grade students, but it could easily be scaled up to accommodate even high school students, by adjusting the depth and difficulty of the various aspects of the program.

THERE IS LIFE AFTER COMPUTER LITERACY I

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Cy-Fair Schools are offering a Computer Literacy II class to their students who clamored for more after Computer Literacy I. This workshop will give you an overview of one of the units created for this class, based on the premise that the course would build on the skills taught in the first class, then expand and enhance using additional tool software and a learning unit designed to strengthen skills learned in the first semester course.

STUDENTS WILL BE REQUIRED TO HAVE A WORKING KNOWLEDGE OF THE FOLLOWING TOOL PROGRAMS:

WORD PROCESSING
DATA BASE
SPREADSHEETS

OBJECTIVES:

Use a word processing program to write letters to states and visitors' bureaus to request information about states.

Research and gather information about states to use in the creation of a data base.

Add records to data base and merge files.

Use graphics software to create a coversheet, title page, maps, personal letterhead, bumper sticker, post card, and cartoon for inclusion in a state notebook.

Create and videotape a public service announcement that invites tourists to come visit your area.

Manipulate a student created data base to find information.

Use a word processor to write a factual narrative describing an imaginary trip to three states.

Create a spreadsheet to calculate and compare the cost of an imaginary trip by car to one by plane.

Manipulate the spreadsheet to answer questions about the cost of the two trips.

Create graphs to compare the distance to each city by car and by plane, the amount of time spent traveling to each city and the total cost of the trip by car and by plane.

Create tables of contents for your notebook using a word processing program.

Culminate the travel unit with a viewing of the videotaped commercials (with outtakes).

Enhance the unit by dressing as a famous native or as a worker from one of the states studied and bringing snacks containing foods produced in the states studied.

PROCEDURE:

In this workshop, a four to six week unit will be explained from beginning to end. All handouts will be included for your use in your own classroom. It does not matter what type of computer your schools are using, nor does it matter which programs you use. The lessons are generic enough to be used in any situation and yet challenging enough to intrigue students at any level.

Students are required to have proficiency in word processing, data bases, and spreadsheets. In addition, they will use tool software to create graphics, graphs, and poetry.

ADDITIONAL SOFTWARE RECOMMENDED:

GARFIELD
PRINT SHOP
PRINT MASTER
GRAPHICS EXPANDER
POETRY EXPRESS
EASY GRAPH
KOALA PADS

A Pascal Linked List Family Tree

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Pascal shows its greatest flexibility in consideration of data structures. This presentation describes the 'linked list' as a common basis for increasingly complex data structures and algorithms. Topics include prerequisite knowledge, the simple linked list, and principal extensions and variations.

Pascal is noted for strong data typing and flexible data structures. The chief concern of this paper is the latter, particularly the concept of a linked list. All of Pascal's attributes come to bear in the various implementations of the concept. The thesis of this paper is that the linked list represents the epitome of programming flexibility in Pascal. After briefly reviewing Pascal skills prerequisites, attention will be turned to a more extensive review of the simple linked list and its principal extensions and variations.

Anyone undertaking a study of linked lists must be comfortable with Pascal syntax and grammar. Techniques for creating and manipulating records should be thoroughly understood. One area often overlooked is a basic understanding of computer memory and addressing. A new data type, the pointer, is introduced for linked list implementations. Pointers are conceptual nightmares to most students, bearing only a vague similarity to the more familiar array index. If memory structure and addressing are not understood, the purpose as well as the implementation of a pointer will elude the student. Not until these few pieces of knowledge are in hand should linked list instruction be undertaken.

The nodes of all linked lists are records. In the most trivial case, that record consists of a single data field and a single pointer field. Unlike static variables, list nodes exist dynamically. Successive nodes in a list are not necessarily contiguous in memory, as are the cells of an array. In all linked list implementations, a variable must be established for the sole purpose of holding the address of the initial node. Because linked lists are dynamic, memory usage will usually be more efficient. However, a price is paid in the form of the more complex algorithms required for accessing the structure.

By simple extension, one can envision a data record much more complex that a single character. Indeed, each node may contain several data fields. Nodes are, after all, records subject to all the inherent privileges of their parent type. However, the limitations in movement and accessing remain the same for all simple linked lists, regardless of the nature of the data field.

Two principal extensions of the simple list are the circular list and the doubly-linked list. These two implementations overcome the rescan problem: having to commence any scan of the list by accessing the root pointer. The circular list operates like a wheel. No additional pointers are required. However, because there is no "Last" node, that pointer has been replaced with one indicating the most previously accessed node.

The circular list represents an improvement in speed over the simple list. The optimum search time would occur when the node to be located is downstream adjacent to the referenced node (0(1)). Worst case would occur if the required node were upstream adjacent (0(n)). Although this is exactly the same scan efficiency as a simple list, there is a considerable gain from beginning each search in mid-list.

Another approach to improving the scan characteristics of a linked list is to allow bidirectional movement. Here, for the first time, in a doubly-linked list, we encounter two pointer fields in each node. The principle of this structure is that bidirectional movement results in shorter relative distances (numbers of nodes) to be traversed than in the circular, unidirectional case. Searches for adjacent nodes in either direction from the referenced node represent the best case for a doubly-linked list, i.e., 0(1). Worst case would be the node halfway around the list from the referent, or 0(n/2).

Variations on the linked list themes discussed above generally entail greater structural complexity. Extending the concept of linear linked lists to binary trees will highlight this point. Picture a simple linear linked list of ordered data. Now imagine bending this list at some interior node and rotating the image into a tepee. The resulting inverted-vee demonstrates the general concept of a data tree. The data contained in the bent list conform to the basic rule for tree structures: nodes in any left branch contain successively lower data values than their parent nodes, while right-branch nodes contain successively larger values. However, the bent-list example is sufficient only for the barest introduction.

The advantage of binary trees is rapid access to ordered data. The position of a given node reflects its hierarchy within the tree structure. In the worst case, nodes will be ordered so that each lies in the left branch of its parent. This is identical to an ordered linear list and has the same scanning efficiency, 0(n). Best case will obviously be a search for the initial node with efficiency of 0(1). If the tree were of equal depth in each branch, the worst case could be resolved binary steps, an efficiency of 0(log n).

Algorithms for scanning tree structures are proper and challenging subjects for study. In fact, the first four Advanced Placement Computer Science (APCS) examinations contained at least one free choice problem involving tree traversal. The concepts of prefix, infix, and postfix notation have direct analogy to preorder, inorder, and postorder tree traversals. All three traversal algorithms can be effectively implemented on a simple binary tree.

In the discussion of principal extensions, we looked at the doubly-linked list, a structure for rapid bidirectional traversal. Each node could reference both its parent and its child. By reorienting the "parent" pointer, a node could reference its child and some other node in the list. Linear lists with this characteristic are referred to as "cross-linked." They give rise to some of the more complex list structures and permit some very interesting applications.

The linked list is a versatile and powerful structural concept in Pascal. Combining as it does the flexibility of records with economy of memory usage, large and complex data structures may be efficiently created and maintained. Although linked lists require more maintenance procedures than files and arrays, the advantages in terms of speed and memory utilization are more than adequate compensation. From a pedagogical standpoint, linked list concepts offer fertile ground for developing an appreciation both of data structures and the techniques required to create and maintain them.

COMPUTER SCIENCE
to
EXTEND - EXPAND - EXCEL

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Every topic taught in Computer Science can be used to reenforce learning from another discipline. This presentation will show how, with careful planning, grammar, spelling, sentence structure, vocabulary, and other writing skills can be developed and improved. The use of information introduced in science, history, and mathematics classes, as well as the use of research and library skills, will be included in this presentation. Numerous program ideas will be offered for the various topics and essential elements of the Computer Science curriculum.

Computer Science is an advanced placement course with so many essential elements that the first reaction tends to be: " I'll never get it all in!". However, the creative teacher has the opportunity to take technology across the curriculum. With a little planning, you will find that not only can you get it all in the allotted time period... you can include some math, a little bit of science, a dab of history and geography, and a great deal of English. The teacher of Computer Science has an opportunity to teach not only organizational, writing, reasoning, and thinking skills; but also the skills of self-expression and inter-personal relationships.

The Computer Science teacher should remember that the most valuable resource available is the faculty itself. Most other teachers will be delighted to find someone else anxious to reenforce what they are teaching. Not only will they give you ideas and lists, your fellow teachers will share with you their secrets for evaluating in their particular discipline.

In addition, students are always more receptive to learning when they can relate to what is being learned and find an immediate use for their new knowledge. The students of Computer Science have the opportunity to reenforce the information learned from other disciplines and to realize the importance of grammar, writing skills, sentence structure, and punctuation too.

How To Have a Successful Student-Run Computer Contest

Mary C. Jones, Teacher
Fort Worth ISD

This session offers a step by step guide to hosting a computer programming and computer literacy contest for students in middle school and high school. Everything from the obvious--designing problems and their solutions--to the unusual--securing prizes from local businesses--will be discussed. The emphasis is on students being responsible for all phases of the contest.

Step 1

Secure the commitment of a core group of students to have a contest.
Computer Science Club
Computer Science Class Project

Step 2

Select a date for the contest and set deadlines to meet that date.

Get on your school calendar and your school district calendar. Check for conflicts with other contests, sports events or test dates.

Step 3

Select a chairperson and committee for each contest area. Define specific responsibilities of each committee.

A. Programming Problems, Solutions and Specifications

Subcommittees for Beginning BASIC, Advanced BASIC and Pascal

Each committee will design, code and test the number of problems needed for each category. Program specifications will be written for each problem including problem statement and test data. Judging forms will be designed including further test data and correct solutions. Sample solution program listings for each problem will be included. Packets for each team will be prepared.

B. Literacy Questions and Contest

This committee will prepare the questions needed for the literacy whiz quiz competition. They will determine point value and category for each question and acceptable answers. They will confirm moderator, timekeeper, judge and equipment needed to run the whiz quiz competition.

C. Prizes and Awards Ceremony

This committee will select the business to provide trophies for all contests. They will determine the entry fee to charge to cover the cost of the trophies. They will contact local businesses for donations to be used in the contest or as prizes. They will organize the awards ceremony and coordinate with the video crew for taping the awards ceremony and the literacy competition.

D. Facilities and Equipment

This committee is responsible for the building. They should select the rooms to be used according to needed plugs and workspace. They decide if we will provide computers and disks or if we will have a "bring your own computer" contest or a combination of both. They make sure restrooms are open, phones are available and equipment needs are met. They secure the buliding afterwards. They provide signs to find your way around.

E. Correspondence and Publicity

This committee produces all letters, registration forms, rules,maps, lists of eating places, evaluation forms, thank you notes and press releases. They also handle the registration table on contest day.

Karel the Robot - A Gentle Introduction to Structured Programming

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The Karel the Robot programming language is a valuable tool for teaching structured programming in an introductory programming course. The language is small, visually-oriented, non-mathematical, and highly motivating. It enforces structure, encourages top-down design, and contains much of the syntax of the Pascal programming language.

Computer science teachers face a number of difficulties in teaching structured, modular,top-down programming to beginning students. Students whose background has included a significant exposure to the BASIC programming language often have difficulty adapting to a structured programming style. They often do not see the advantages in the structured approach to programming since their small, unstructured programs produce correct results. Programs sufficiently large and complex to require structured programming techniques for success are not practical at the beginning of a first programming course.

Top-down design and modularization are concepts which are often presented at the beginning of a programming course. However, the use of these techniques in writing programs is usually delayed significantly by the necessity of learning a great deal of the syntax of the programming language. Further, in the Pascal language, the difficult issue of pass-by-reference versus pass-by-value must be dealt with when modular programming with procedures is introduced.

The Karel the Robot programming language is an excellent tool for introducing students to structured, modular, top-down programming. The Karel language is small, highly structured, non-mathematical, and incorporates much of the syntax of the Pascal programming language. The language does not include variables, and consequently no arithmetic operations. There are only five primitive instructions in the language, and the control constructs are very similar to those of Pascal. There are two decision structures (IF-THEN and IF-THEN-ELSE) and two looping structures (WHILE loop and FOR loop). The mechanism for defining new instructions (equivalent to Pascal procedures) is simple and closely follows Pascal syntax.

Because of the very small number of instructions provided in the language, students quickly recognize the need for defining their own instructions. In a very short time, usually the first or second class period, students begin writing modular programs and can utilize top-down design techniques.

The Karel language is used to direct a 'robot' within his 'world'. The world is a 2-dimensional grid of 'streets' and 'avenues', and may contain walls, through which the robot cannot pass, and objects called beepers. The robot can see the walls and hear the beepers, and these senses are used to generate test conditions for the decision structures and the WHILE loop sturcture of the language. The world is configured with an editor (world builder) to create a task to be solved by a Karel program. Typical tasks include the 'harvesting' of beepers, stair-climbing, hurdle races, and mazes. Since the language does not include variables, it is possible to design complex tasks which can be solved by students who are not familiar with algebra.

The Karel the Robot language provides an excellent introduction to structured programming. It can be learned very quickly, enforces structured programming practices, encourages modular design, and can be used by students with any mathematics background. Since most of its syntax is identical to Pascal (including the semicolon rules) students very easily make the transition from Karel to Pascal.

MULTIPROCESSOR SUPERCOMPUTERS

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This paper will introduce the reader to several computer architectures of the future. A brief comparison of the standard von Neumann architecture with modern multiprocessor computers will be given. Two Non-von Neumann machines, the Hypercube and the Connection Machine, will be discussed.

The traditional von Neumann computer architecture is what most often comes to mind when computers are discussed. The von Neumann computer, simply stated, consists of a memory and a single CPU. In general, the CPU retrieves an instruction and its associated data from memory, executes the instruction, then repeats this process for the next instruction. Great strides have been made to help speed up this sequential process. Advances have been made through techniques such as pipelining and interleaved memories as well as through faster hardware. In spite of the fact that some of these computers work at remarkable speeds, millions of instructions per seconds, there are, at least currently, limitations in speed due to the sequential nature of these machines.

In order to achieve the desired goal of speed, other avenues have been pursued. One of these, the topic of this paper, is multiprocessor computers. A multiprocessor computer is one which contains several, perhaps thousands, of CPU's all capable of working simultaneously. While parallelism has been contemplated as far back as the 1800's when Charles Babbage built his analytical engine, it was not until the late 1960's that the first parallel processing computer was built. In the following years many multiprocessor computers were designed but very few were built until recently. Current research shows that at least 25 companies are currently building multiprocessor computers.

There are two specific multiprocessor architectures which will be discussed in this paper. Hopefully, this will provide insight into the differences between single processor and multiprocessor computers as well as the differences between different types of multiprocessor architectures.

The Connection Machine (CM) is a parallel computer conceived by Danny Hillis as a student at MIT over ten years ago. He formed a company, Thinking Machines Corporation (TMC), in 1983 and since that time has sold at least ten computers at over $1 million each.

The CM supports up to 65,536 processing elements in a 12-dimensional hypercube structure. However, plans are to use as many as 1 million processing elements. The custom designed processing elements are smaller and less powerful than we would find in a single processor computer. In addition, each of the processors has its own memory unit.

The CM is classified as an SIMD (single instruction-multiple data) computer. That is, each processor in the computer is sent the identical instruction. Then using data from their own memories, each processor executes the instruction synchronously.

For example, suppose we have 30 students each having 4 exam grades to be averaged. On the CM we would first store each individual student's grades in the memory of a single processor. Next we would send the instructions to each of the 30 processors to calculate the average. They would all begin and end together and complete all 30 averages in the time it would normally take to calculate one.

This example is oversimplified, but it does provide the basic idea. Actually the CM is controlled by a host computer, usually a VAX or a Symbolics. This host computer sends out instruction one at a time to the processors then receives the results. Thus, the host is used for I/O by the user.

MIT Press publishes a book, The Connection Machine by Danny Hillis which provides a detailed design of the machine. In addition, there are several articles written describing different applications.

Another example of a multiprocessor computer architecture that is also in production is the hypercube. Intel Scientific Division and NCUBE, two companies in Washington state, are presently marketing hypercubes. NCUBE uses 1024 custom VLSI microprocessor chips in a 10-dimensional cube, while Intel uses a 7-dimensional cube made up of 128 80286-microprocessor chips.

By definition an n-dimensional hypercube computer is constructed from 2^n processors connected in such a way that each processor is directly connected with n neighbor processors. For example, the eight corners of a box form a 3-dimensional cube with the edges representing communication lines between processors.

Each processor in a hypercube can be thought of as a small independent microcomputer with its own processor, memory, and I/O ports. Hypercubes are capable of very high performance when problems are properly decomposed and placed on the available microprocessors. Decomposing refers to the process of splitting an algorithm into distinct sections of code that may be executed in parallel on separate processors. As a result, this architecture is often referred to as MIMD. MIMD stands for multiple instructions-multiple data and indicates that each of the numerous processors has its own set of instructions and data, independent of all the others.

The major stumbling block to the use of the hypercube computers is the very difficult task of properly decomposing the algorithm in order to maximize the parallelism. As a result, program decomposition is becoming a major area of research today.

The future of computers lies in parallel processing. While in the past programmers had to deal with maximizing the use of a single processor, they now find themselves confronted with a massive array of architectures that are totally different and provide a totally different set of problems. However, the potential to be realized from these architectures is staggering.

RUN ME RAGGED

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This presentatin will attempt to demonstrate how multiprogramming works on a single processor computer. Multiprogramming (multitasking being a special case) is the procedure used in modern computer systems that allows a single processor to run several programs concurently. An amusing and informative technique involving student participation will be used in this demonstration.

Multitasking is an operation few students truly understand particularly at the implementation level. If dealt with properly the author feels that the topic is well within the grasp of an average student in a high school computer science class. The presentation must include a clear demonstration of the dynamic process required of even non-computer related multitasking systems as well as how a computer performs the task. Once the multitasking process is well understood, background printing, continuous time display and other related operations are easily understood. This presentation will attempt to demonstrate and explain multitasking in a way relevant to the high school class room.

A teacher may begin a discussion of multitasking using a simple non-computer related example such as the simultaneous summing of two or more large addition problems. Use a gong or buzzer to tell the student when to switch between problems. The importance of this exercise becomes clear when the class tries to deal with intermediate results and other related information.

In order to continue our discussion into the area of computers we need a very simple computer together with an example set of assembly language instructions. Assuming our computer contains a single user register called A the following would suffice.

```
Add  address        (* add contents of address to reg A *)
init number         (* initialize reg A to number        *)
load address        (* load reg A from memory address    *)
store address       (* store reg A at address            *)
inc, dec            (* inc  or dec reg A by one          *)
ldpc  address       (* load pc from address              *)
stpc  address       (* store pc to address               *)
```

We first step thru a simple example program demonstration of the basic machine cycle as shown below.

1. Fetch instruction pointed to by the PC
2. increment PC
3. Decode instruction
4. Fetch operand
5. execute instruction
6. goto 1

When this is clear show a large section of memory containing two independent programs and their related context switch save areas along with a special traffic-cop program required to perform the switching operation. Demonstrate the multitasking process at this point by following the execution sequence, one instruction at a time. When an interrupt(student generated) occurs switch to the traffic-cop and begin execution of the code found there. This code will perform the required context switch and thus start up the execution of another program (process). The loading and unloading of necessary information from the save areas(also known as Process Control Blocks) should also be demonstrated. The actual switch operation that occurs when an interrupt occurs is very important and should not be slid over.

Although the above may seem overly complex (it is in the real world!) the presenter will hope to show a simplified way to study multitasking without skipping the important features.

STACKS, TREES, and RECURSION WITH BASICA

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This presentation will demonstrate an application of a random access file to create a binary search tree in BASIC. In-order traversal of the tree demonstrates the use of a user-defined and user-maintained stack (array) and a form of recursion (a subroutine calling itself). The specific application presented will be a student directory program, however, other applications will be discussed. In addition to traversal of the tree, procedures to insert, delete, modify, and print selected records will be presented. The use of the random access files, the stack, and the tree will be explained.

STRUCTURE EDITOR BASED PROGRAMMING ENVIRONMENTS: AN OVERVIEW WITH INITIAL RESULTS ON STUDENT PERFORMANCE*

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Structure editor based programming environments are now becoming both affordable and practically useful for introductory computer science education. These integrated environments combine under a single uniform user interface the functionality of editing, translating and testing high level language programs. Rather than edit only single letters and other characters, the student constructs a program from structural elements defined by the semantics of a particular language. Students using these environments are both relieved from needless concern for low level details, and are provided with tools that can direct their attention to program structure and design. Preliminary results suggest that they do in fact perform better than students using standard editing and compilation tools.

Computer programming courses have long been known for their difficulty and "technical" nature. As such there seems to be an increasing tendency to question the need and desirability of including programming in the general education curriculum. This trend is both unfortunate and unnecessary. The counter claim that teaching programming skills can serve as the "new Latin" is undoubtedly overstated. But, properly presented, programming methods courses can focus students' attention on higher levels of conceptual abstraction. Whether or not those sorts of thinking skills are transferable to other domains, it surely is possible for a wide range of students to gain an informed understanding of the programming process.

Traditionally students are forced to spend an inordinate amount of their time learning low level details of language syntax and tool invocation. Rather than focus their attention on the conceptual structure of intellectually difficult problems, they spend their limited time learning where to put semi colons and single quotes. And the problem is confounded by algorithmic languages like Pascal, which do impose additional syntactic burdens. Not only must the student learn the semantics of a high level programming language, there are different cryptic command languages to learn for an editor, compiler, possibly a debugger, and the operating system that coordinates them all.

This paper describes the structure editor based programming environments that we are developing at CMU, and reviews our efforts at evaluating their impact on the students we purport to teach. The environments, known collectively as *MacGNOME*, currently are being developed with support from the National Science Foundation. An environment for *Karel the Robot* is now available commercially through*Kinkos*. One for *Pascal* is currently in use in beta test versions at CMU and a number of other test sites.

Why should a computer science educator want to use an integrated environment based on a structure editor? "Algorithmic thinking" often is said to characterize computer science as a discipline. Yet the details of language syntax and tool invocation frequently make computer programming a very tedious and error prone process. Early emphasis in programming courses usually focuses by default on narrow details rather than overall structure and design. And we end up rewarding tenacity and attention to detail more than conceptual clarity.

The development over the past several years of integrated programming environments allows us to place the emphasis of introductory courses where it more properly belongs: on high level design skills. For rather different reasons, such is appropriate both for general education and for those students who will go on to concentrate in computer science.

An integrated environment built around a structure editor automatically provides the syntax of the language being edited. The student starts with a partially complete program skeleton and replaces "placeholders" with code that is guaranteed to be syntactically correct. Choices for valid program construction are made from elements based on language structure. Thus in Pascal we edit statements, expressions, procedures, declarations and the like, all well formatted and accompanied by any necessary concrete syntax. Compilation is done incrementally, with errors being reported in both physical and temporal context. Similarly, run time and help systems that use information about program state and student error profiles can be gracefully integrated into such environments.

Such environments can change the process of programming in fundamental ways. Not only do they remove the novice programmer from needless attention to what are essentially extraneous details, they can also provide powerful support tools for structured program design and testing.

An integral part of our work involves the empirical assessment of these environments. As such we are conducting both semester long field experiments and more circumscribed laboratory experiments. Initial data analyses show that using the environments does improve student performance on programming assignments and examinations by as much as one full letter grade. They do particularly better with respect to program modularity and the quality of their procedural abstraction. In addition survey data show widespread satisfaction with the environments, along with a preference for them over more traditional editing and compilation tools.

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Survey of Secondary Computing Curriculum in Texas

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Abstract

As part of the state curriculum reforms enacted in 1984, the Texas Education Agency defined new computing courses at the secondary level. These included Computer Science 1, Computer Science 2, and computing courses in mathematics, business education, and vocational education. With the cooperation of the Texas Education Agency, an instrument was developed and submitted to the 1305 secondary schools in Texas to determine the current status of the secondary computing curriculum. The results of this statewide survey establish the degree to which districts have implemented the curriculum, the computing facilities which are available for these courses, and the personnel available to teach the curriculum. Data was also gathered regarding the enrollment of male and female students in specific computing courses. The results of this survey provide important baseline data for future studies.

Background of Survey

In 1984 the state of Texas enacted legislation which produced broad reform of the state elementary and secondary curriculum. One component of this legislation defined a new set of courses to introduce and develop computing skills at the secondary level. These courses included Computer Science 1 and Computer Science 2, Computer Mathematics, Business Education computing courses, and Vocational Education computing courses.

This study provides a systematic survey of the state to determine the degree to which these courses have been implemented and the facilities and personnel which are available to develop the new computing curriculum.

Methods

During the fall of 1986, a survey instrument was developed with three key objectives: (1) to establish the degree to which each secondary computing course has been implemented in the state; (2) to determine the level of teacher expertise available throughout the state tosupport the secondary computing curriculum; (3) to determine the computer facilities available to support the secondary computing curriculum. Special attention was also given to several other issues, such as the two new Computer Science courses (Computer Science 1 and Computer Science 2) and the relative numbers of male and female students enrolled in specific courses.

The instrument was sent to each high school in the state during January and February, 1987. Stamped return envelopes were enclosed with each instrument. By May 1, 1987, 389 surveys had been returned, and the results of these surveys were analyzed during June and July, 1987.

Results:

Objective 1: The survey investigated the degree to which Texas high schools have implemented the recommended TEA curriculum. Table 1 indicates the percentage of the entire sample which has implemented each of the computing courses.

Course	% State Sample Offering Course
Computer Science 1	31.4
Computer Science 2	13.9
Computer Math 1	63.5
Computer Math 2	18.3
Business Ed: Advanced Typing	48.1
Bus Ed: Comp Programming	36.0
Bus Ed: Data Processing	41.4
Voc Ed: Word Processing	30.8
Voc Ed: Data Processing	8.2
Voc Ed: Comp. Programming 1	4.1
Voc Ed: Comp. Programming 2	2.3
Voc Ed: Comp. Programming 3	0.3

Table 1. Percentage of sampled high schools offering specific computing courses

Objective 2: To determine the experitse of current teachers, the survey sample listed the number of teachers currently engaged in teaching each course, and the certification level of each teacher. (TEA has established appropriate certification for each of the computing courses.) Table 2 shows the relative number of appropriately certified teachers reported in the survey

Course	# Teachers in Sample	# Teachers Certified	Per Cent Certified
Computer Science 1	139	82	59.0
Computer Science 2	40	23	57.5
Computer Math 1	296	282	95.3
Computer Math 2	59	57	96.6
Business Ed: Advanced Typing	202	191	94.6
Bus Ed: Comp Programming	182	150	82.4
Bus Ed: Data Processing	219	190	86.8
Voc Ed: Word Processing	135	126	93.3
Voc Ed: Data Processing	39	32	82.1
Voc Ed: Comp. Programming 1	20	8	40.0
Voc Ed: Comp. Programming 2	9	5	55.6
Voc Ed: Comp. Programming 3	1	1	100.0

Table 2. Summary of the number of fully-certified teachers engaged in secondary computing courses, as reported by survey sample.

Objective 3: To determine the computing facilities available for the secondary computing curriculum, the survey determined the number and types of computers in use for instructional computing.

Statewide, the survey sample reported a mean value of 34.7 instructional computers per school, and a mean student/computer ratio of 23.5. Of the total instructional microcomputers reported in use by the sample, Apple II-series microcomputers represented 47%, and IBM PC or IBM-compatible computers represented 22%. These computer models were followed by TRS-80 computers (15%), Commodore 64/128 (7%), Macintosh (1%), and others (7%).

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Teaching Computer Arithmetic with Bits Teams

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At the High School for Science and Engineering in Fort Worth, Texas, a game was developed in 1981 for the purpose of teaching concepts in computer arithmetic. The game involves teams of students called "bits teams." Each team consists of sixteen students. Eight students form the input register and eight students form the accumulator register. Each student represents a bit, and the contest consists of how fast and accurately a team can add, subtract, and multiply a series of numbers by turning their bodies to represent the "on" and "off" bit states. The "bits" interact with each other to accomplish various operations such as register shifts, complements, etc. The final answer is exhibited in the accumulator in binary and is then converted to decimal orally.

Each bit in the input and accumulator registers has a value. The first bit in each register has a value of 1, the second has a value of 2, the third has a value of 4, the fourth has a value of 8, and so on up to bit #7 with a value of 64. Bit #8 is the "sign" bit and determines the sign of the answer. To begin the contest, an integer from 0-127 is called out with an appropriate operation. The bits in the input register must immediately turn off and on in such a manner as to form the number. Bits facing forward are considered on and bits facing backward (away from the audience) are considered off. For example if the number 29 is called out, the bits would orient themselves as follows:

#8	#7	#6	#5	#4	#3	#2	#1
off	off	off	on	on	on	off	on

which represents the binary number 00011101 = 29.
Each bit determines immediately whether to be "off" or "on" to form the given number by using various algorithms (many students have done it so much, they know immediately) The most popular method is to divide the value of the bit into the number, ignoring any remainder. If the quotient is odd, the bit is "on," if even, the bit is "off." Obviously the #1 bit has an easy job, since even numbers mean "off" and odd numbers mean "on." Bits, of course, needn't worry if the called number is below their value. Students devise many clever algorithms for determining off and on. In the above example for 29, bit #16 is "on" since 16 will divide into 29 one time and the number 1 is odd.

After the number is formed in the input register, it must be "accumulated" in the accumulator. This is done by a "tapping" procedure. The rules for bits in the accumulator are as follows:

(1) If a bit is tapped, it must reverse its present state; that is, if on, it must turn off, and vice-versa.

(2) If a bit is on when it is tapped, it must tap the next highest bit as it spins off.

When the captain (usually bit #1 in the input) gives the command to accumulate, the bits in the input that are "on" tap the corresponding bits in the accumulator causing the addition to take place appropriately via rules (1) and (2) above. The input bits then immediately spin to the "off" position and await a new number. A round consists of 5 operations. For example, "add 29," "add 78," "subtract 99," "multiply by 9," "subtract 70,"

Subtraction is accomplished by complements. To subtract 99, the input bits would form 99, then the captain would give the command for all bits after the first "on" bit to bit #8 to reverse their state. This accomplishes the complement. Another method would be to reverse the state of all bits in the input register and then add 1 by reversing the state of the first bit and tapping accordingly in the input bits. After forming the complement, the captain gives the "accumulate" command, and the contents of the input register are "tapped" in appropriately to the accumulator.

Multiplication is accomplished by "shifting" the bits in the input register after the current state of the bits in the accumulator have been transferred to the input register. For example, suppose the current number in the accumulator register is 17, and it is desired to multiply by 7 (00000111). The bits that are "on" in the accumulator would tap the corresponding bits in the input in order to transfer the result to the input. A "soft shift" is accomplished by the "on" bits in the input reversing their state and tapping accordingly (rules 1 and 2). The captain would issue the following commands:

(1) "Accumulator, store and hold"
0 0 0 1 0 0 0 1 acc = 17
0 0 0 1 0 0 0 1 input = 17

(2) "Shift"
0 0 0 1 0 0 0 1 acc = 17
0 0 1 0 0 0 1 0 input = 34

(3) "Accumulate"
0 0 1 1 0 0 1 1 acc = 51
0 0 1 0 0 0 1 0 input = 34

(4) "Shift"
0 0 1 1 0 0 1 1 acc = 51
0 1 0 0 0 1 0 0 input = 68

(5) "Accumulate and reset"
0 1 1 1 0 1 1 1 acc = 119
0 0 0 0 0 0 0 0 input = 0

The bits contest and algorithms were developed by Mr. Gary B. Hicks and his students at the High School for Science and Engineering in Fort Worth, Texas. All rights are reserved. More information can be obtained by sending a self-addressed, stamped 8 1/2 by 11 envelope to the above address. We are the world champions in bits competition. If you form a bits team, give us a call...it's lonely at the top!

THE MISSING LINK

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The use of linked lists as a data structure for implementing ordered lists provides a significant improvement over dense lists as implemented in arrays. In addition, the are multitudes of applications available for assingments to students. This paper will provide an introduction to the use of linked lists. The accompanying talk will provide more detail regarding the actual implementation of the data structure in Pascal.

A list can be defined as a set of items which has a given order. The order may be random as opposed to alphabetical or numerical, but we do think of a list as being sequential in nature. With respect to the computer implementation of a list, the simplest data structure to be used is an array in which, form the programmers point of view, the items are stored contiguously in memory and processing can proceed in this manner.

Problems with the use of arrays arise under several conditions. One is if the data is dynamic. That is, data items are constantly being added and deleted. In an array the holes left by deleted items must be filled. This can be done by taking the last item of the list and moving it. However, the problems are compounded when a specific ordering must be maintained, such as numerical or alphabetical. In such a case, simple moving a late item into a hole will not do because of the ordering. Instead, each item below the deleted one must be moved up within the array. Likewise, if an item is to be added to the list, items may have to be moved down within the array in order to provide space in the appropriate location in order to maintain the order. The processing time for such a list, if large, may be prohibitive.

One solution is to use a linked representation. While not always the best data structure for handling data, the linked list does provide a significant improvement over the array. The savings will be in processing time, the cost in the amount of memory used.

In general, a linked list is a data structure used for maintaining data in a recognizable order without actually storing them in contiguous locations or even in a fixed size array. Implementation methods vary, but, in general, the data itself is stored in memory and associated with it is a pointer or link. This link is some form of the address of the next item in the order.

Let us consider an example. (See Figure 1) We will implement a linked list within an array structure alphabetically. Note that Becky is the first item logically. The number 3 tells us that the next item, John, is in location 3. The 1 associated with John indicates that the third item is in location 1. The zero associated with Steve indicates the end of the list.

	data	link
1	Steve	0
2	Becky	3
3	John	1
4		

Figure 1

start = 2

1	Steve	0
2	Becky	4
3	John	1
4	Fred	3

Figure 2

If we now wish to add an item, Fred, to the list, it would be placed in location 4 and the only values changed are the links. (See Figure 2) Notice that the only links that are the ones just before and just after the newly added item. An additional piece of information needed is a variable to indicate the beginning of the list.

Another method of implementation is through the use of dynamic allocation of memory as opposed to the use of an array. That is, request memory as it is needed as opposed to allocating 1 array at the compilation time. This can be done in a language such as Pascal, but not in Fortran or Basic. This method utilizes system generated actual addresses, not indices into an array.

With both methods there is a small core of three routines necessary to handle the manipulation of data. These include:

Search & Traverse: begins at the first of the list and follows links through to the end of the list; used in inserting, deleting, modifying, or processing an element of the list

Insert: given the location of the item logically prior to the inserted item, it updates the links

Delete: given the location of the item to be deleted, it updates the links to remove the item

These routines, which may be found in most beginning data structures texts, with slight modification, can be used to perform most operations necessary.

Now to the title. Why the title "The Missing Link"? Because a single missing or incorrect link will totally destroy the entire list. And this is the KEY to using a linked list, to manipulate links properly without "losing" one. In this regard, the array implementation is easiest for students because they can dump an array to determine what is happening. This is not possible in the dynamic allocation method. However, when using arrays, the programmer must also keep up with which array locations are available for reuse. In dynamic allocation, this is handled by the system.

The use of linked lists is an excellent exercise for students, providing the groundwork for other data structures such as trees and graphs. The topic is covered thoroughly in all beginning data structures texts and in many programming language texts. The accompanying presentation will include the Pascal routines and suggested assignments.

Topics in AP Computer Science -- Graph Theory

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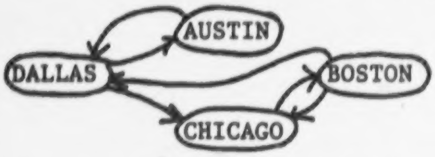
A study of graph theory is an informative introduction to trees which are a special case of graphs. A basic understanding of graph theory gives the AP Computer Science students a glimpse into the variety of applications for data structures. A graph is a set of vertices and edges between those vertices. A graph can be directed (digraph) or undirected. The tree is a special case in that a tree cannot have any cycles (a cycle is a path that returns to the original vertex). There are several algorithms which use data structures such as stacks and queues with which the AP students would be familiar. Graph theory also reinforces other topics such as the two-dimensional matrix and recursion. At this level, students can be introduced to the general ideas behind graph theory without actually coding the algorithms into a language. Included are some definitions and pseudo-code for various algorithms using graphs.

Definitions

GRAPH - set of objects called vertices and edges, where an edge represents a path between two vertices.
UNDIRECTED GRAPH - the edges do not have a direction indicated.
DIRECTED GRAPH - (DIGRAPH) edges have a direction indicated (usually by an arrow).
PATH - list of vertices from one vertex to another along specified edges.
ADJACENCY MATRIX - for N nodes, this is an N x N matrix such that $M(i,j) = 1$ iff there is a path from N_i to N_j (an adjacency matrix for an undirected graph would be symmetrical since if there is a path from N_i to N_j there must also be a path from N_j to N_i).
LENGTH OF A PATH - number of edges traversed (or number of vertices minus one).
CYCLE - directed path that starts and ends on the same vertex.
CONNECTED GRAPH - there exists a path from every vertex to every other vertex.
ACYCLIC GRAPH - graph with no cycles.
NETWORK - (WEIGHTED GRAPH) a graph in which the edges are weighted.
MINIMUM SPANNING TREE - selected brances from the graph such that every vertex is connected to every other vertex using minimum weights.
DEPTH FIRST SEARCH - visit every vertex of a graph going as far down one branch as possible before beginning down the next branch.
BREADTH FIRST SEARCH - visit every vertex of a graph traversing each level completely before proceeding to the next level.
DEGREE - the number of edges at a given vertex.
INDEGREE - the number of edges going into a given vertex (of a directed graph).
OUTDEGREE - the number of edges going out of a given vertex (of a directed graph).

Typical Applications

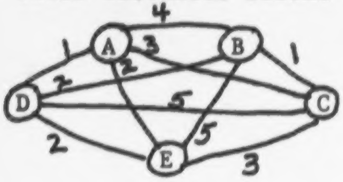
A. Adjacency matrix - build an N x N matrix for N vertices and make matrix M such that M(i,j) = 1 if and only if there is an edge from N_i to N_j. This matrix will represent the paths of length one (an edge from the first vertex to the second). Find the matrix M^2 to find the paths of length two, the matrix M^3 for the paths of length three, etc. M to the power N would represent all the possible paths without repeating a vertex. For example, an airline has service to only four cities: Austin, Boston, Chicago, and Dallas. There is a flight from Dallas to Austin, from Austin to Dallas, from Dallas to Chicago, from Chicago to Chicago (around the airport), from Boston to Chicago, from Chicago to Boston, and from Boston to Dallas.

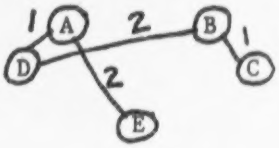


$$M = \begin{array}{c|cccc} & A & B & C & D \\ \hline A & 0 & 0 & 0 & 1 \\ B & 0 & 0 & 1 & 1 \\ C & 0 & 1 & 1 & 0 \\ D & 1 & 0 & 1 & 0 \end{array} \qquad M^2 = \begin{array}{c|cccc} & A & B & C & D \\ \hline A & 1 & 0 & 1 & 0 \\ B & 1 & 1 & \textcircled{2} & 0 \\ C & 0 & 1 & 2 & 1 \\ D & 0 & 1 & 1 & 1 \end{array}$$

From the M^2 matrix, we find that there are two paths from Boston to Chicago of length two, and indeed there are (Boston to Chicago to Chicago, and Boston to Dallas to Chicago). Similar information can be derived by forming M^3 and M^4.

B. Minimum spanning tree - given N vertices that are weighted, find a minimum subtree such that there is a path from every vertex to every other vertex. Suppose there are five homes in a neighborhood which wish to be connected to each other by a sidewalk using minimum concrete. Distances between each home and the other four are measured. These distances become the "weights."





```
Include any vertex to begin with
for all vertices not included
    include the vertex whose weight
       with an already included vertex
       is smallest
    add that vertex and edge to the
       minimum spanning tree
```

C. Depth first search - go as far down one branch of a tree as possible before going down the next branch.

```
(recursive)  DFS(v)
     mark v as visited
     for each vertex adjacent to v do
       if not visited, call DFS() for it
```

```
(iterative)
 put vertex v into a stack
 repeat
   remove a vertex from the stack
   mark it visited
   put all vertices that are adjacent
      to it and not visited in the stack
 until stack empty
```

D. Breadth first search - search an entire level before going to the next level.

```
put vertex v into a queue
repeat
  remove a vertex from the queue
  mark it visited
  put all vertices that are adjacent
    to it and not visited in the queue
until queue empty
```

WHY FRESHMAN FAIL
(HOW TO PLAN A GROUP PROJECT)

BY
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Computer science class projects are very important learning experiences, especially for the teacher! I found out the hard way when I had my computer class do their first major project. If there was a mistake to be made, I think I made it. I hope that others can learn from the mistakes that I made. I am going to present an overview of the process that I use to plan class projects. I will concentrate on all phases of the project including: choosing an appropriate subject for the project, placing the students into groups, teaching the students grouping skills, dividing the problem into manageable parts, assigning individual grades, and polishing the final project.

In the spring of 1986 Ruth Jones, the other computer science teacher, and I decided to have our students do a class project. We wanted our students to apply all of their newly gained computer knowledge to a single project. We also wanted to teach them something about cooperation, modularizing, and how to work through proper channels to accomplish a goal. In reality it was the teachers who got the education.

We decided to do a statistics program that would analyze a large amount of data. The freshman class was chosen as the subject for our little experiment. The students were to find out why the freshman class had such a high failure rate. The computer students constructed a survey instrument, obtained permission from the administration to administer it, wrote a statistics program to analyze the data, interpreted the results, and wrote a report detailing their findings.

The project did not go exactly as we had hoped. We found out that there was much more to it than we had originally anticipated. The students were used to working alone, and they had to be taught to work in groups. They had to learn to think in terms of we instead of me. Other important skills to be learned were positive interdependence, individual accountability, how to handle face-to-face interaction, collaborative skills, and processing.

As teachers we had to learn to carry out our roll's. We had to set forth a very explicit agenda, help the students make decisions, monitor all activities and intervene when needed. It turned out to be a much more demanding task than we had anticipated. Until the students learned proper cooperative skills a lot of intervention was needed. As the students grouping skills increased, with a little help from the teacher, the students were able to function much more efficiently on their own.

As we were teaching grouping skills, we also worked on their programming skills. They were used to working alone. When they had to work with other groups they began to understand the importance of some of the programming concepts that they had been learning, but not using. Each group was assigned a small module that had to mesh perfectly with the modules being developed by all of the other groups. For the first time the students understood why they needed to use meaningful identifiers, pass parameters, and in general write good clean structured code.

As the project progressed, they learned that good software indeed did have certain general characteristics. They learned to write software that was reliable, maintainable, modifiable, flexible, efficient and easy to use. They did not do this because they wanted to; they did this because they had to in order to complete the assignment.

Writing the program turned out to be the easy part of the project for the students. They experienced a great deal of frustration when they had to go through the proper channels to get the project approved. They had no idea how complicated an undertaking it would turn out to be. Initial permission was obtained and they started to write a questionnaire. That instrument went through at least a dozen revisions before it was even submitted to the associate principal for approval, two more revisions and it was ready for the director of instructions approval, and after several more revisions they received final approval. Lively debates erupted over fine points of grammar and phrasing. They discussed invasion of privacy, how to tactfully phrase delicate questions, and how to write questions that were not leading.

With finished questionnaire in hand they made arrangements to use it. It was decided that the students who wrote the instrument should be the ones who administered it, and they were not used to dealing with students who were not in advanced level classes. It was interesting to hear the horror stories that they told about their inability to communicate with the average freshman.

After they had collected the data and used their program to generate the statistics, they had to interpret the data and write a report. I was fasinated as I watched the students discuss what they did incorrectly; I took careful notes as they had many good ideas. Next time I would be better prepared.

Doing a group project can be a rewarding experience for both students and teachers. However, the teacher must lay the groundwork carefully, and he must be willing to work as hard or harder than the students.

A COMPUTER CAMP FOR KIDS

Pat Jackson
Grand Prairie ISD

"Computer Camp for Kids" at Texas Wesleyan College is the idea of Dr. Mark Wasicsko, Dean of the School of Education. Dr. Wasicsko has been successfully Directing Computer Camps with the aid of graduate students for a number of years on the TWC campus in Fort Worth, Texas. The purpose of this presentation is to share my unique experience in helping to conduct one of the Computer Camps and encourage other teachers to expand upon the idea in a variety of ways to suit the needs of their district, school or community.

Most schools now have computer labs which could be utilized during the summer or evening for instructional purposes for children as well as adults. The variety of software purchased for use in regular classrooms could be used, or new software could be purchased for the computer camp. Teachers with basic computer skills, who could be awarded AAT credit or paid a fee for their involvement in the program, could provide instructional and motivational leadership as camp counselors. Using Future Business Leaders of America members or the local high school Computer Club members could be another source for counselors. Older teens relate well to younger children and could be good role models.

At TWC, "Computer Camp for Kids" was based on the essential elements for Computer Literacy. The target group was 9, 10, and 11 year-olds. The essential elements provided a variety of activities to keep the children involved and motivated for a two-week period. Activities were organized on a rotation schedule and children were divided into groups. Children were divided by age level, with activities scheduled in short time periods of thirty minutes to one hour depending upon the attention span required for the activity. A general "camp" format was used. Campers arrived at 8:30 and left at 4:30. Campers ate in the TWC dining hall and had access to all recreational facilities on the campus which included gymnasium, swimming pool, and tennis court.

The activities campers seemed to enjoy most were naming and publishing their own camp newspaper, watching the original skits by counselors, visiting the Fort Worth Museum of Science and History, and creating their own robot. At the last general session of the camp, certificates in many areas of computer literacy were awarded, and campers enjoyed a video presentation highlighting people and events of the camp session.

Ideas for activities for a computer camp came from a variety of sources. Computing magazines were a good source of ideas for games and activities. Activities that work in the classroom were also fun to use for computer camp. The book, My Students Use Computers by Beverly Hunter, which contains many learning activities for Computer Literacy, was also useful.

A Journey Through Graphics and Music to Vocabulary Land

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A program for teachers who are growing with their children, and who like to be involved with them in new and exciting ways to learn vocabulary. Working with vocabulary using the computer as a tool will motivate students to think logically, provide immediate feedback on performance, and gives a student a chance to demonstrate his or her creativity.

A demonstration of the Animation Station and the Vocabulary Programs that the students produced will be shared by Jackson students throught a VCR tape.

Children take a skeleton program written in BASIC and change it by changing data statements. They add music using instructions from Apple Music and incorporate graphics created with the Animation Station. Using vocabulary words from the Macmillan Reading Series, students become familiar with definitions.

Through use of the skeleton program that is an example of top-down programming, students are learning BASIC programming skills. They load the skeleton program and change the data statements. Then they create pictures with the Animation Station and write code to display the hi-res pictures on the screen. Music is written by putting pitch and length each each note.

As all the pieces come together, children are proud of their finished product. A print-out of the pictures can be sent home showing parents one facet of what goes on in the computer lab.

An Elementary Computer Resource Center

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THORNTON ELEMENTARY
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TEMPLE, TEXAS 76502

A plethera of choices for utilizing computer technologies in education has developed dramatically in recent years. Even with this increase, computer technology has yet to greatly impact elementary education. In an effort to investigate an alternative approach for integrating educational technologies into the educational environment (other than the traditional student-centered approach) a model was developed based on the perceived needs of the educator. The model proposes that by introducing computer technology to the classroom teacher as a tool for resolving his/her needs, the teacher will come to learn the potential of educational technology as a problem-solving resource and then gain the confidence and vision to more greatly explore its other potential as an integral part of the instructional process. The model has been partially implemented with subsequent stages of development to be based on evaluation results.

SUBJECT: Utilization of Computer Technology in Elementary Education. According to Kulik, educational researchers and developers are no longer asking whether a computer revolution will occur in education, but are asking how it will occur (Kukik, J. & Kulik, C., 1987).

OBJECTIVE: To integrate the use of computers into the elementary school at the campus level. The findings of the National Task Force on Educational Techology indicate that although information technology represents a "powerful array of tools when creatively and appropriately integrated" the successes have been marginal due to negative aspects including lack of planning, inequitable distribution, inadequate software and obsolescence (The National Task Force on Eductional Technology, 1986). A well-planned systematic and comprehensive integration of computers can prevent repetition of such deficiencies and maximize the potential of the technology.

PRESENT SITUATION: There are four identified areas in which computer technology could enhance the efficiency and productivity of teachers and the instructional process. Test scores and teacher feedback indicate a need for individual instruction and tutoring. Teachers are experiencing increasing demands for administrative tasks including student tracking. Students are receiving little or no exposure to computer technology to prepare them for greater utilization at upper grade levels. Currently available computer technology affords limited resource to adequately explore the application of the technology.

PROPOSAL: A Computer Resource Center (CRC) to apply the technology in the following areas:

1. Computer Assisted Instruction - the center will facilitate both teacher training and classroom application of utilizing computers as instructional tools.
2. Tutoring - the CRC will facilitate individual tutoring for children with demonstrated deficiencies, according to defined criteria, or special interests.
3. Laboratory - the CRC will provide skill development for all students in terms of keyboarding, word processing and LOGO.
4. Professional support - the CRC will provide support for faculty in terms of classroom management (scheduling, grade reporting, etc.) and instructional development (materials design, instructional program development,etc.).

The CRC will be self-contained and centralized and will have the capacity to relocate appropriate equipment to various classrooms for specific instructional applications.

ADVANTAGES: The computer-assisted-instruction function will provide teachers with new options to provide individual and small-group instruction and to capitalize on the affinity for the technology which is acquired by many students via video games and home computers.

The CRC will provide specialized tutorial instruction for all students of a common learning diagnosis throughout the school, thereby not only meeting a specific need but saving monies otherwise expended on duplications of common software.

The centralization of the technology will result in a laboratory with an accumulation of a wide range of software and programs which would not be fiscally possible to duplicate for each classroom.

The CRC will provide a common resource for professional services for faculty including student tracking, inventories and preparation of instructional materials. The utilization of common technological resources will facilitate faculty instruction and utilization of those resources.

A centralized resource center for the entire campus will enhance management of the hardware and software including inventory, maintenance, utilization, and upgrading as well as orientation and training.

DISADVANTAGES: In the staffing of the CRC the teacher of each grade will be responsible for student acquisition of skills, therefore all classroom teachers will be obliged to become computer literate and knowledgable of the current software and its applications. However, a well designed falcuty development program involving "outside" expertise and "inhouse" consultation will be provided.

ACTION: To meet these goals there will be a need to allocate teacher time for training and organization of the Computer Resource Center, and funding for the acquisition of hardware and software.

APPLE HELPS YOU MEET THE NEW TEA ELEMENTARY COMPUTING RECOMMENDATIONS

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ABSTRACT

As the Texas Education Agency moves to provide direction to the new elementary computing recommendations (outlined in the Master Plan for Vocational Education), Apple Computer is working to provide assistance and support for elementary computing applications. The new Apple Early Language learning series, software curriculum guides, information about keyboarding instruction and long-range planning, are a few of the projects and programs currently available from Apple which will help schools plan to meet these new state requirements.

An Overview of the State Elementary Computing Plan

The Master Plan for Vocational Education (Texas State Board of Education, January 11, 1987) outlines several action plans regarding computer-related competencies in grades K-6. The major portions of this plan relating to elementary computing include the following statements:

> -Action Plan (2-A1): Develop and integrate computer related competencies (including keyboarding) as appropriate in grades K-6. (This action to be accomplished through cooperative efforts of the TEA Curriculum Development and Educational Technology staffs.)
> -Students will acquire knowledge and skills regarding computer related competencies at an earlier period in formal education.
> -Phase-in period of K-6 introductory computing begins September 1988.
> -Full implementation of K-6 introductory computing should be in place by September 1992.
> -Action Plan: Develop new and update existing computer literacy essential elements as technology changes and also as may be appropriate as action plan 2-A1 is implemented (This action is to be accomplished by the TEA Educatinal Technology staff.)
> -Students will acquire up-to-date computer related knowledge and skills.

These components of the State Board of Education Master Plan for Vocational Education will clearly impact every local school in Texas, and will influence local decisions about appropriate use of technology at the elementary level.

Planning considerations for elementary computing

The first important step in appropriate use of technology in the elementary curriculum is careful and thoughtful long-range planning. Our understanding of the new TEA requirements (based on frequent interactions with the TEA Educational Technology staff) is that the planning component will be the emphasis. This means that local districts will be encouraged to develop elementary applications which truly meet the needs of youngsters, rather than applications which meet a rigorous, well-defined set of state requirements.

To support the notion of effective long-range planning, staff in the TEA Division of Educational Technology have designed a model for district-wide planning. This model is a *process* approach, and provides for campus level, as well as district level, planning activities. (For additional information about this model, contact Tom Boudrot at TEA. Copies of the plannning document can also be obtained from any of the four Apple education representatives.)

Apple is supporting this planning concept in a number of ways. First, each of the Apple education account executives has met with staff in the Division of Educational Technology, so that our interaction with schools is consistent with state direction. Second, we are working with several schools as active committee members in the planning process. We strongly believe that, as a vendor involved in helping to provide support to effective utilization of technology, we have a responsibiltiy to assume an active role in the planning process. In this way, we can help insure that we are positioned to respond to the needs of individual districts. We also believe that we can provide a kind of "futures" perspective about the kind of technological solutions likely to be available over time.

And finally, Apple is compiling information about exemplary elementary applications across the state. We believe that "schools helping schools" can be one of the most effective planning resources available.

Software support in elementary computing

Most educators now realize that software support is critical to effective use of computers in the elementary curriculum. Access to high quality software is essential, but knowledge regarding instructional use of such software is equally important.

To facilitate effective use of software, Apple has developed several documents which, we hope, will prove useful as schools plan to meet the TEA elementary computing requirements. The Apple Curriculum Software Guides provide a comprehensive set of "essential elements," lists and descriptions of top-quality software, and curriculum correlations. These components make up the "curriculum matrices" which make correlation to essential elements a much easier task for Texas teachers. There are currently five such documents: K-6 Reading/Language Arts, 6-12 Reading/Language Arts, K-6 Mathematics, 6-12 Mathematics, and K-12 Science. The Apple Software Guides may be purchased directly from Apple for twenty dollars each. (Contact your Apple Education Account Executive for details)

Teacher training.

Whatever applications districts choose in elementary computing, teacher training can be the critical link for success. Apple has developed relationships with many major software publishers, so that we can facilitate training of teachers. This program is called the "Apple Staff Development Workshop," and includes a choice of 52 workshops given by 15 publishers. Apple does not charge any fee for this program. The only requirements have to do with minimal numbers of participants, and our ability to match district or Education Service Center calendars with our consultants' calendars. We will also assist in applications for AAT credit for these sessions.

We encourage districts to plan for effective and focused teacher training as plans are developed for the elementary computing program. Districts wishing to take advantage of the Apple workshops should work with the appropriate Apple Education Account Executive, review the list and availability of sessions, and coordinate training dates. Smaller districts might want to work cooperatively (in order to meet the minimal attendance requirements) or through the Education Service Centers.

Full integration. . or "Putting it all together."

Realizing that there are certain key elementary applications for which schools may want a comprehensive, full curriculum solution, Apple has recently developed a new project called the "Apple Learning Series." The Early Language Learning Series is one which many schools are using as one component of their elementary program.

The Early Language Series (for K-2 reading/language arts) is designed to help schools integrate the use of computing into the regular instructional program. We carefully selected high quality software and peripherals from major publishers, added a teacher guide book (complete with lesson plans and essential element correlations), and a full day of teacher training. This complete package is available directly from Apple. And, because we chose to work with major software publishers, schools wishing to expand the program beyond grade 2 have access to instructional software at the upper elementary grade levels as well.

Taking advantage of the "Apple Assistance" for elementary applications.

Schools wishing to invite Apple participation in long range planning, or seeking additional information about any of the various programs described above should contact either their local authorized Apple education dealer, or one of the four state education account executives. They are:
Jan Burton (214-770-5800), Bruce Farrall (214-770-5800), Bill Hanson (713-682-3200), or Sandy Pratscher (512-338-2115).

BRIDGING THE GAP BETWEEN ELEMENTARY MATH AND ALGEBRA: SOFTWARE AND ACTIVITIES

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A large number of students entering high school algebra are underprepared to make the transition from elementary and middle school arithmetic to algebra. This session is an outgrowth of research designed to:

(1) identify the mathematics concepts, vocabulary, and skills that should be emphasized in upper elementary and middle school arithmetic to enhance the learning of high school algebra and

(2) develop and identify activities and computer software to support the learning of those concepts, vocabulary, and skills.

The Delphi research technique was used to achieve consensus of experts in the areas of elementary, middle school, and high school mathematics; and university faculty in mathematics and mathematics education regarding mathematical foundations of algebra. In the second phase of the project, experts provided suggestions of activities and software for use in supporting the concepts, vocabulary and skills identified. A series of teaching activities were developed that incorporate some of the software identified.

This research underscored the existence of a gap between concepts, vocabulary and skills taught at K-8 levels and those needed by students entering Algebra I. This gap seems to result in a jump from concrete, manipulative, procedure and pattern-oriented thinking to much more abstract, problem solving-oriented thinking. The vocabulary load becomes suddenly heavier as more precise mathematical terminology is used to describe problems and processes.

From responses to research inquiries, it became evident, that teachers are generally knowledgeable of the curriculum at their teaching levels (elementary, junior high, high school, for instance) but there is little extension of that knowledge beyond their grade levels. Most teachers of elementary level students seem generally unaware of what concepts and skills lead to particular concepts and skills in algebra. Most secondary teachers seem to know what skills students entering their course lack and what skills their students need in order to perform well in their course, but are generally unaware of what skills and concepts are taught at the elementary level that build foundations for these concepts.

Teachers of mathematics, regardless of their teaching level, should be provided with information concerning the progression of concepts and skills that lead to success in the transition to the abstract ideas and problem-solving procedures in algebra. This extension of knowledge and understanding will help elementary and junior high teachers know where the concepts they teach are leading, and help secondary teachers know how to build foundations for students who need remediation.

The group of experts in this study identified the following domains as those that build foundations for algebra : fractions; decimals; ratio, proportion and percent; measurement; geometry; probability and statistics; problem-solving; numeration; and square roots and powers. They identified concepts, vocabulary, skills, and software for each domain. A summary of these are included in the resource booklet that will be distributed at the session.

Additionally, experts suggested these areas of particular teaching emphasis. Use of:

(1) precise mathematical language;

(2) mathematical axioms in all situations where they apply so as to become automatic;

(3) the hierarchy of operations which should be taught and reinforced as soon as applicable.

(4) format and symbols-what they mean and how they affect the procedure for solving problems should be taught and reinforced.

This session will provide an overview of the research and a progression of activities in the above areas. A resource booklet including research findings, computer-based activities, and a list of commercially available software will be distributed. A diskette of teacher-made activities will be available for participants who bring a blank diskette to swap.

COMPUTER TECHNOLOGY: A WAY TO COST EFFECTIVELY IMPROVE INSTRUCTION?

by
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Chairman and Professor
Department of Educational Administration
Baylor University

ABSTRACT

An impending teacher shortage, reduced funding, and a need to provide more individualized instruction have placed unprecedented strains on the Texas education system. Can computer technology help relieve some of this strain by providing good, individualized instruction? If so, can that technology be cost-effective? The author explores these questions, and supports his answers with outside research.

INTRODUCTION

As we try to improve the quality of education, we must reduce or at least maintain education's cost. As a state, the Texas objective is admirable, and in this author's thinking, doable, but it will take some rethinking about how to best apply what fiscal resources school districts have at hand.

One of the areas mentioned most frequently as holding great promise is computer technology. Opponents of this technique say it is too expensive. Proponents of computer technology say it is cost-effective. Which is true?

First let's define computer technology in schools as any computer-assisted instruction (CAI). Then let's take a look, briefly, at the history of this medium.

In the early days of computer-assisted instruction, users had to choose between stand alone microcomputers or networked "dumb" terminals. Those who chose stand alone microcomputers found little educational software available: those who chose networked instructional systems could not use their computers for anything but the educational software that came with the system. Recently that has changed. Now educators can benefit from the best of both models with an integrated learning system (ILS), which in a networked microcomputer environment, delivers a comprehensive curriculum to students. The ILS is system managed, so student learning is self-paced and interactive, and can be tracked automatically with progress reports.

Technological innovations like the compact disc read-only memory (CD-ROM) have improved the integrated learning system as a cost effective, convenient method for delivering CAI. The CD-ROM has also made it possible for other productivity tools and educational software to be delivered on the network with the comprehensive software of the integrated learning system. Integrated learning system users may still opt to turn off the network and use their microcomputers as stand alones.

What the CD-ROM and the improved capabilities of an integrated learning system do is to improve an integrated learning system's ability to give educators more for their money. And what exactly is more?

INTEGRATED LEARNING SYSTEM IMPROVES TEST SCORES

In a word: results. A recent study by San Diego area school using Education Systems Corporation (ESC) software, shows significant increases in populations with low and high socioeconomic backgrounds. At Martin Luther King School in San Diego, California, a school with a history of high mobility and low academic performance, students dramatically improved their scores on the California Test of Basic Skills (CTBS). Specifically, the number of fifth grade students ranking with the top half of students in reading rose from 15 percent to 31 percent. For mathematics, the number of students performing in the top fifty percent increased from 26 percent to 41 percent.

At the other end of the spectrum, an affluent suburban school in San Diego, California experienced gains in CTBS reading scores from the 80th to the 98th percentile—a gain of 18 points. CTBS mathematics scores increased from the 95th to the 98th percentile.

Principals at both schools attribute a significant portion of these gains to the integrated learning systems in their schools.

IMPROVED LEARNING ATTITUDES

In another survey, teachers, parents and students, responding in a confidential survey, said that their integrated learning system instilled self-direction and enthusiasm in students. Teachers also said that they observed instructional improvement, and a high degree of transfer of lab work to classroom activities. Parents reported that their children liked going to school more as a result of working in the computer lab, and students said that their integrated learning system helped them do better in the classroom.

Other research on computer technology suggest that it increases "motivation for learning, because it can be nonjudgmental, it provides immediate feedback, it allows students to work at their own pace, and it helps raise students' "status" in their schools."

CAI IS COST EFFECTIVE

In a study by Dr. Cecil McDermott at the Arkansas Department of Education, CAI was found to be very cost-effective at providing individualized instruction. In fact, his study shows that CAI is as much as 200% less expensive than reducing class size, or increasing class time to address the same needs. The cost effectiveness study was based on average gains (grade equivalence) in reading and mathematics resulting from an expenditure per student per year in each subject and relates to a $3,000 yearly cost of education per student.

CONCLUSION

Increased test scores and improved student attitudes are not the only reasons to invest in computer technology. Clearly, computers can be used in a number of ways to help students learn how to think, which may, in this world of rapidly changing information, be as important as teaching content. An integrated learning system that can deliver comprehensive, full color curriculum with good management capabilities can be a strong solution to providing solid individualized instruction to a growing number of students, especially in a state that faces an impending teacher shortage.

Computers Can Enliven Your Chapter I Program

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20100 Saums Road Katy, Texas 77449

This presentation will include many ideas to help with worksheet generation, in practice drills, and motivation of Chapter One Students.

When the computer age descended on education, the gifted and talented students were the first to be considered for these fancy new contraptions. There are a group of students who can learn as much if not more from computers than the gifted students. These students have difficulty learning and need many different ways for material to be introduced and mastered. These are students who qualify for the Chapter One Program. Since the Chapter One student has difficulty with learning, the computer is an excellent way to jazz up worksheets, practice drills, and motivate this special student.

The Apple IIe computer is a wonderful way to make worksheets more interesting and are easy for the teacher to make. It is simple and easy with Print Shop and a few graphics disks.

Most students hate practicing math facts, reading skills, or spelling words. Thanks to MECC (Minesota Educational Computing Consortium) and many other programs this dislike can be changed to a willingness to learn.

Many Chapter One students have had a great deal of failure. These students can be highly motivated very easily with the use of the computers. There is software that is perfect for this type of student.

In this day of computers, the Chapter One student can benefit a great deal. Through simple and easy computer help, the Chapter One student can become a more confident and a better student.

Elementary Computing: The Happening Place

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Abstract:
This session will deal with methods and materials for teaching keyboarding and special ways of answering the problems of insufficient budget and scheduling. This session will present an overview of the curriculum developed for the Abilene Independent School District with an emphasis on the section k-5.

With the mandating of computing for elementary levels we are going to see more and more districts scrambling to meet the needs of children in grades k-5. The areas that are going to be most crucial seem to be keyboarding, computer languages, CAI, and the question of integrating computing into the classroom curriculum.

This session allows for exchange of ideas and question and sharing. We will discuss and show some commercial keyboarding programs as well as some programs that are public domain software. A discussion of ways that the classroom teacher can deal with the computing requirement in the regular classroom will take place. Each element of the Abilene program will be discussed and examples of the methods and materials that are used will be presented.

With a beginning being made it will be necessary that all of us combine our efforts to assure all the students of Texas the very best computer education pcssible.

Gail Alldredge   Rebecca Hunter

Plano ISD

Implementing a Networked CAI Lab

Implementing a networked CAI lab requires goal setting and much planning. This slide presentation will detail the steps necessary for planning, ordering, and assembling the lab. Suggestions will be offered for staff and student training in lab use. Selecting networkable courseware to meet district goals will be discussed as well as requirements for lab maintenance and updating.

Implementing an effective CAI program in a school district involves many people and requires rigorous planning. Individuals who are involved in the initial stages include district administrators, members of the community, and teachers. This committee is charged with determining the needs and goals for the program. They are expected to outline their requirements in a format which can be presented to the district personnel who will be responsible for locating and procuring the hardware and software which matches the outlined requirements.

Locating the appropriate hardware and software is time consuming. Many vendors are interviewed and are asked to demonstrate how their products meet the district's needs. Some vendors choose to implement pilots in selected schools within the school system. Others choose to invite school personnel to visit sites where their products are in use. During pilots and visitations, district representatives evaluate products using an evaluation instrument which has been created based upon the committee's guidelines. Upon completion of the evaluation, it is necessary to determine how the vendor will support the program. Will the vendor provide training, lab setup, and/or technical support?

The most important consideration for choosing a vendor is the courseware which is offered. The selected vendor must offer courseware which matches the district's instructional objectives for the subjects and grade levels targeted by the planning committee. The courseware must meet the district's criteria for providing effective instruction.

After a thorough evaluation of several products, hardware and software are selected. A presentation is made to the school borad for purchase approval, and implementation begins. Ordering is done. Deliveries are made. Assembly of equipment and installation of courseware is completed. Once the lab and/or labs are in place, training begins.

In order for CAI to be effective, teachers must know how to use the courseware and the equipment. They must be familiar with the courseware just as they are familiar with textbooks. Familiarity comes with intensive training. Inservices and ongoing training sesssions must be scheduled and well planned. Ongoing support of the lab must be provided and explained. Our slide presentation will demonstrate the steps involved in the implementation of multiple networked labs.

INTRODUCING COMPUTERS IN THE ELEMENTARY SCHOOL

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An overview of a step-by-step computer curriculum format that can easily be incorporated in the daily classroom elementary program. The presentation includes a scope and sequence, activities on and off line, along with skill development applications from other content areas to integrate computers into the total elementary enviornment.

Teaching in the elementary schools today has been met with new challenges and obstacles as a result of a fast moving, ever changing society. A total integration of computers has proved to be the most effective teaching approach found to date in the Judson Independent School District as evident in yearly academic achievements.

Investing in computer hardware and software is an expensive endeavor at a time when finances can be a serious problem for many school districts. Thus, the investment must be utilized in as many areas of curriculum as can be incorporated into the total elementary setting.

Instruction in basic usage of hardware and software is just a beginning point for students in discovering the magical world of computers. It is important for students to be educated in the fundamentals of operating hardware and software. This instruction can be applied later in other applications of computer uses.

Not only must students be aware of computer operational procedures but, they must also become proficient in using the keyboard. Keyboarding skills not only improve the competence of the student's use of the computer but, incorporate a wide integregration of Reading/Language Arts skills, and coordination development into the total learning picture. Exposure and later mastery of these skills improve the achievement levels of students as they are exposed to other instructional strands of computer education.

Personal and business applications are also incorporated into the presentation of tool application software. This presentation not only teaches students direct useful skills but, also is an excellent career preparation for the future.

While basic operating procedures and keyboarding skills are important, the most beneficial strand of computer instruction is that of problem solving. Teaching critical thinking skills in any subject area is the ultimate goal for education as we strive to develop higher level thinking in our students. We in the Judson District have put a definite emphasis on this area via BASIC programming skills as well as through LOGO activities. These structured problem solving encounters help students develop skills that will carry over in all other avenues of learning they will encounter.

Other areas for computer application can prove to be of great productivity for students and teachers. Computer Assisted Instruction (CAI) not just in resource or remedial settings but, for basic instructional purposes can have trememdous impact in creating an exciting learning climate. The concentration level, interest level, and one on one individualized instructional level of the student can be more closely adapted to each student through computer use. The student mastery levels will rise as the learning enviornment is more readily adapted to his learning style as well as his academic ability through computer use.

In conclusion, if we as educators are to fulfill our goal to prepare these students to be productive, effort to integrate the computer into their learning experience. Not only will the students learning experiences be more productive but, their skills for a place in this increasingly technological society will be far more refined.

Introducing Preschoolers to Computers:
One Teacher's Perspective

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An overview reflecting the changes that occurred in one teacher's perspective on introducing preschoolers to computers though LOGO graphics activities is presented.

The purpose of this presentation is to provide an overview of one teacher's perspective on introducing six preschool children to computers through a variety of LOGO graphics activities that were designed by the teacher. Data collected in collaboration with the teacher during late spring 1985 include (a) observational notes, (b) audiotaped teacher-researcher interviews, (c) teacher's lesson plans and journal, and (d) samples of the children's computer graphics. Complementary data include (e) videotaped recordings of teacher-child interactions that occurred during 10 consecutive Saturday morning sessions in a computer lab at the University of Texas at Austin; the lab was created especially for the children. After extensive preparation of the raw data, analysis focused on: (1) the off-computer and on-computer activities proposed, planned and implemented by the teacher, (2) the communicative strategies used by the teacher and the children, including patterns of interaction evident in transcribed segments of the videotaped computer sessions, and (3) the teacher's thoughts about this experiences as revealed through her responses to weekly interview questions. This presentation focuses primarily on the third aspect, the teacher's perspective, and highlights preliminary findings reflecting the changes that occurred in the teacher's intentions, expectations, reflections, wonderings, opinions, and concerns over the course of the study.

I wish to acknowledge Project Quest at the University of Texas at Austin for providing the IBM computers used in this study.

KEYBOARDING INSTRUCTION IN THE ELEMENTARY SCHOOL

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A new emphasis placed on teaching Keyboarding Skills in the elementary school will be discussed in this presentation. Integration of other curriculum areas as well as proficiency in using the keyboard will be addressed for all levels K-6.

As computer usage is emerging into all facets of elementary education, a need for more emphasis on keyboarding skills is arising. Effective teaching of these keyboarding skills is not only a means for improving the effectiveness of the student's computer usage but, is a means for developing many other valuable curriculum skills.

While the ultimate goal is to develop student skills in word processing and any other involved typing activity, keyboarding skills must begin at an early age to be most effective. Coordination development, letter recognition, one to one correspondence, and matching of letters or numbers are but a few of the valuable skills addressed when teaching keyboarding skills to a kindergarten child. This young child will be more readily able to spell his first name when given the opportunity to type it on a computer keyboard. In the end, this young child will not only have mastered many learning skills but, will have mastered the beginning keyboarding skills as well.

After an early introduction to keyboard usage, these skills can now be advanced and refined as the child grows. Once the initial key recognition has taken place, the skills then advance to using correct fingers for each key. Isolated instruction of each key with correct finger assignment is most effective when given orally from the teacher first then remediated through a chosen keyboarding software program. When several of these instruction sets have been completed the integration of typing a given word list, sentences, or a story can be productive practice material as well as great integration for other subject areas. This process can be repeated for all keys using a variation of practice activities.

The instruction of keyboarding skills has proved to be most effective in the Judson Independent School District when begun in kindergarten or first grade and given priority over other computer curricular strands through grade four. By the conclusion of fourth grade, the student will be competent enough to complete a computer activity requiring typing skills with little difficulty. These skills can now be refined and perfected through longer typing projects along with speed drills for continued practice. It has been found, however, that if the formal ksyboarding instruction is begun after fourth grade, it is met with less success. At this level, students have developed poor habits in keyboarding use which are difficult to correct. The earlier the instruction is begun, the easier it is to develop good keyboarding practices and skill.

Besides developing the student's skill at keyboarding use, the formal keyboarding skill instruction has other valuable attributes. To effectively work through a keyboarding lesson, a student must use proficient listening skills. He will refine eye-hand coordination skills as well as his skill at following directions.

In summation, keyboarding instruction is only the beginning of many valuable learning skills as well as the key to the magic of computers.

KEYS TO SUCCESS IN AN ELEMENTARY COMPUTER PROGRAM

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Elementary computer programs vary, not only from district to district, but also from school to school. What should be the focus? Are long term goals needed? What parameters should be set? Should the program be based on using the computer as a tutor, tool, or tutee? Will the primary focus be literacy or curriculum? The list goes on. Each program must deal with these questions. KEYS TO SUCCESS IN AN ELEMENTARY COMPUTER PROGRAM is a workshop that attempts to look beyond the areas mentioned above. Four basic keys are identified. The first, and most important key, is organization. The other three keys are motivation, flexibility, and resources. These four keys can make THE difference in the quality of any elementary computer program!

KEYS TO SUCCESS IN AN ELEMENTARY COMPUTER PROGRAM is a concept based on the assumption that a program is not necessarily successful because student, staff, community, and school needs are being met. It certainly takes organization, motivation, flexibility, and the utilization of many resources. This combination of keys, together with curriculum goals, most assuredly creates a dynamite computer program.

Organization starts with written goals. What curriculum needs are to be met? What proficiencies will be addressed? Once this is done, look at the target population in terms of scheduling. Take a close look at scheduling restrictions in terms of the population to be served and goals to be met because potential conflicts can be averted beforehand with the least amount of disruption.

The next step is to start, and maintain, a file of basic forms, masters, etc. that are used again and again. This is invaluable in saving that all too precious commodity of time. Save forms such as schedules, sign-in sheets, parent letters, and so on. Some people color-code software, student folders, resource files, and other groups of materials. This kind of organization assures that material can be found quickly and most efficiently.

Organization can be as detailed and meticulously adhered to as is needed by the teacher. The trick is to know what needs to be done and then to do it. All of this organization sounds like a lot of work but in the end the effort is worth it. The motivated person will find the time to do something right.

Motivation usually comes from within. One must look for ways to put pizazz into any program be it reading, math, social studies, science, computers, and so forth. If the routine gets boring, do something different or out of the ordinary! Nothing creates excitement and interest like new projects, new material, or special events. Be enthusiastic. Computers are on the leading edge of an exciting technological revolution. Allow this excitement to shine through at every opportunity!

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Flexibility means to be ready to change or modify as needed. This could mean changing the material and/or routine. Flexibility is related to motivation in that the teacher should think positively. Running a successful program can be hard work. Not only should everything be kept on a positive note, but the importance, value, and excitement of the program should always be stressed.

Finally, the incorporation of resources cannot be stressed enough. These resources are discussed in detail and a resource list provided to workshop participants. Resources include not only software but also speakers, field trips, sharing sessions with others in the field, and computer idea books. The value of attending workshops and conferences should not be overlooked. These provide necessary revitalization and help to prevent burnout. The very best resource is to develop a network with other elementary computer teachers that will provide friendly, supportive, computer-related advice, information, and assistance.

It is hoped that the reader can use the four keys of organization, motivation, flexibility, and resources to enhance his or her computer program. It is hoped that each participant will have come away with several ideas which can be modified, if needed, to fit the particular computer program.

Meeting Your Spelling Objectives with a Speech-based Computerized Spelling Program

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The objective of **Spelling Speechware™** is to help students attain spelling mastery through a computerized program that is adaptable to local needs, is based on a sound educational design, and utilizes speech in a highly functional way. The multi-level program contains an extensive database of 9000 words, representing the combined word lists of the major basal spelling texts. Each word is presented in a context sentence, providing the means to present each lesson in both visual and auditory form. Built-in management capabilities track student progress and allow printing of both individual and class records.

Spelling Speechware™ incorporates computer-generated speech, tutorials, and motivational lessons for supplemental practice on spelling words, for Grades 1 through 6. Its objective is to provide students with effective procedures when studying spelling words, and to provide teachers the means for successfully creating and managing this process. All students will benefit from this program, but it is especially valuable for students who have difficulty learning to spell with traditional study methods.

Key educational principles incorporated into **Spelling Speechware** are:

Meaningful Contexts. Each word is presented with a context sentence, insuring that spelling is not separated from meaning.

Combined Auditory and Visual Presentations. As a word is introduced to the student, it is spoken by the computer; the word may be respoken as often as necessary by pressing the Apple key. When the student has trouble spelling a word correctly, the program prints and says the word, and then visually highlights and pronounces each letter.

Immediate Feedback. During a practice session, the student receives immediate feedback, indicating whether the spelling of each word is correct or not. The program guides the student to mastery of the correct spelling by focusing attention, reinforcing the correct spelling, and providing additional practice.

Focusing Attention. When a word is misspelled, the student is shown exactly what part of the word was spelled incorrectly. After a second error, the program displays the correct spelling and pronounces each letter. Student attention and effort are directed to the specific parts of those words that need further study. Attention is focused on the correct spellings, not on the errors.

Additional Practice. After an error is corrected, the program gives the student as much time as needed to study the word; the screen is then cleared and the student spells the word again. Troublesome words are repeated at the end of the session for reinforcement.

Motivation. By making it easier for students to master their spelling words, the program motivates them to study spelling. Students prefer working with the program to studying on their own.

Summary of Success. At the end of a practice session, the program displays lists of words spelled correctly and words that require further study. These lists can also be printed.

Spelling Speechware also incorporates features designed to assist the teacher with managing the spelling process and with providing the means for successfully adapting this program to meet the varying needs of each class or individual student.

Ability to Create Spelling Units. The program provides disks for teachers to use when creating lessons keyed to their own spelling text. Each package includes a printed list of the words for that particular level. Speech encoding and a context sentence are tied to each spelling word.

Record Keeping. The program keeps records for all students on a Lesson Disk, providing the teacher with summary reports and with reports detailing each student's spelling errors in each unit.

Option Settings. The teacher controls which units the student practices, controls whether the student receives a preview of the words before the practice session, and controls whether the student receives printed lists at the end of the practice sessions.

For each level, the package consists of: a Teacher's Disk, which is the boot disk and also contains the management routines; Dictionary Disks, containing the speech code and context sentences for all of that level's spelling words; and Master Spelling Units Disks, containing the Houghton Mifflin spelling units. Teachers using another spelling series create their own Master and Lesson Disks.

The product is available on the Apple IIe with an Echo+ Speech Synthesizer, on the Apple IIc with a Cricket Speech Synthesizer; color or monochrome monitor; Apple printer.

Networking in a Primary School Computer Lab

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Elgin ISD selected a networked computer lab which utilizes both MS-DOS and Apple software to improve TEAMS scores in the primary grades. The lab is administered by a certified teacher assisted by the classroom teacher. The program is partially credited for improvement of TEAMS scores.

Elgin Independent School District conducted a needs assessment based on instructional and administrative input. The only computers in the district were 15 IBM PCs used for computer literacy in the eighth grade and 10 Radio Shack, Model 4 computers used by the High School business department. Based on a need to improve basic skills Primary School was targeted to begin a long-range plan of computer acquisition.

A decision was made to look for a MS-DOS network based on studies of published evaluations of hardware and software and visits to various vendor demonstrations. While software vendors had doubled the amount of MS-DOS software available for primary grades, more software was available for Apple computers. Elgin ISD acquired Tandy 1000 computers with Trackstar which could use both MS-DOS and Apple software. The computers are linked by Tandy Network 4.

The networked computer lab is run by a certified teacher trained on the network. When classes are scheduled into the lab, the classroom teacher accompanies the class and serves as a co-instructor allowing individualization of instruction. Teachers should be trained on the software and hardware prior to implementation.

The room for the lab was selected for security and ease of access within the building. The room was wired with separate breakers and ground wire. The layout was considered so that all children could see the overhead and the teacher without moving around. The host station and printer were placed in a corner away from traffic lanes.

The computer coordinator selected software based on TEAMS objectives identified as areas needing improvement. Criteria was developed for evaluation of individual selection.

At the end of the first year TEAMS scores were improved. The computer class is viewed as one of the contributing factors. The lab was accepted well by teachers within the school, by parents, students, and the School Board. Children attending the computer lab exhibited no discipline or motivational problems. Because of the favarable results and parental pressure to continue computer education a second lab was purchased for the Elementary School.

A committee is currently working on a districwide sequential plan for computer instruction in grades k-12.

Producing the Elementary School Newspaper with Newsroom

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This presentation will demonstrate how to organize students in the elementary grades to produce a school newspaper using the computer program Newsroom. An outline of procedures and examples of works produced by students will be shared. Participants will see a demonstration of the use of this program.

Learning how to produce a newspaper offers students an opportunity to use several higher level thinking skills, including application, analysis, synthesis, and evaluation, and then see aproduct for their efforts. Further, students with varying learning styles can be successful while reinforcing many of the basic skills learned in every academic subject they are studying.

But, producing an organized and attractive newspaper requires a maximum amount of teacher organization so that in the end the student feels that it was he who produced the newspaper. The teacher must establish the rules for procedure and then be prepared to all the students to produce the final product. By following procedures the students can be taught how to interview subjects, and then determine the main idea of the topic. Once the pertinent facts have been secured, the student must learn how to sequence the facts in order to present a logical news story. These are skills that are included in every elementary school teacher's essential elements and standardized tests.

From past experience, it has been determined that the newspaper should be divided into sections, or topics. At Santa Gertrudis School the newspaper is generally six pages long and appears the last school day of each month. The first page is devoted to school news. The second page has features, and when needed, some editorial comments. The third page is one devoted to class notes, or information about special projects happening in the classroom.

The fourth page has sports news. The last two pages have crossword puzzles, examples of student produced creative writing, or art work. One student is responsible for each subject area. The computer program determines the length of the story and the number of stories to each page. On the first school day of the month the editor and the newspaper sponsor determine the stories that are to be assigned to each page editor and sets deadlines. The sponsor then reviews the assignments with each reporter and helps in the formulation of questions and the determination of who to interview. On deadline day each reporter, the editor and the sponsor determine the artwork that will accompany the story. In the first months the sponsor does all the typing, and determines the layout of the newspaper, as well as proofreading. As the school year progresses the editor increasing does the layout, and the reporters do the typing. The sponsor always proofreads and requires the student to rewrite the story until it is entirely correct. Students are working under a deadline. If the story does not meet the deadline a blank space, with the students byline, and a newspaper headline is left in the newspaper.

The staff is selected from students in grades five through eight. However, the student who is assigned to do the class notes section of the newspaper, works with students of all grade levels to secure the necessary information. Staff selection is from applicants from the entire student body. It is considered an honor and a privilege to be a member of the staff.

Once the newspaper is produced it is widely distributed. Each student receives a free copy. Further, the newspaper is sent to each member of the School Board, and distributed in the community. Because our school is located on a very large ranch, it is the primary source of communication between the public and the school. Therefore, the students are especially conscious of the importance of their work. The administration has often used the publication as a public relations tool, and gives it to any visitors.

Successful Elementary Keyboarding

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Keyboarding is a cumulative psychomotor skill involving the touch method of input to a standard keyboard device.The goal of keyboarding instruction to enable students to be more efficient in computer use and to avoid lengthy re-teaching of keyboarding skills. The method presented allows teachers to reach their goals for their students' keyboarding through direct instruction and includes the careful monitoring of each student.

Would you teach a group of fourth grade children how to use a slide rule? Although many fourth grade children possess the ability to comprehend simple mechanics of a slide rule, the amount of time invested in the teaching and reinforcement of this skill would not justify the end result unless they needed the skill to perform well in a school setting. And, if the skill were deemed important for those fourth graders, it would be necessary to continually use and reinforce the skill in later grades. In other words, the importance of the skill will determine the time invested in its instruction.

We must keep this notion in mind when we begin to design a keyboarding program in the elementary grades. The amount of access and degree to which students will use keyboards should determine the level of instruction they receive. Students who will use word processors daily must receive intense keyboarding instruction and continuous reinforcement. Conversely, students interacting with drill software that requires single key input do not need a 20 word-per-minute keyboarding proficiency.

The following situations are presented to illustrate appropriate solutions to student keyboarding needs:

PROGRAM A

Keyboarding need: Children in all elementary grades will use commercially available problem solving software in math and science classes. Most of the software requires single letters to be typed by the students.

Keyboarding instruction/follow through: Two lessons are supplied to the math teachers that cover the keyboard key arrangement, proper finger placement on home row, and correct reaches. Special attention is made to the correct keystrokes for the RETURN key and ESC key (since the software uses them heavily). Practice using commercially available keyboarding software is encouraged.

There is no word per minute goal for the students since they do not type full sentences. Teachers encourage students to keep fingers on home row, reach appropriately for the RETURN and ESC key, and use both hands to stroke keys. All teachers in the school have been made aware of these keyboarding behaviors and are encouraged to reinforce them as observed in the children's keyboard use.

PROGRAM B

Keyboarding need: Children in grades 3, 4, and 5 are scheduled into a computer lab three times a week for computer assisted instruction in basic skills (20 minutes each session). The software requires the students to type sentences. Students seldom type more than a single sentence at a time.

Keyboarding instruction/follow through: Before beginning use of the basic skills software, teachers spend three weeks in the lab instructing students in computer operations and keyboarding skills. Students received instruction in proper posture, hand positioning, and finger stroking. Through a series of nine-20 minute lessons, students received direct instruction and guided drills in keyboarding using a commercially available book.

Once a week during lab time, students spend 10 minutes reviewing keyboarding skills using commercially available software. Teachers monitor student keyboarding behaviors and provide individualized instruction as necessary. There is a goal of 11 words-per-minute for student keyboarding though formal timings are only conducted three times during the school year and are used for student information only.

As students move to the next grade, they are tested in their knowledge of keyboarding skills before beginning basic skills instruction on the computer. For most students, four-20 minute lessons are adequate to bring their level of keyboarding use up to the desired 11 words-per-minute.

PROGRAM C

Keyboarding need: The writing program has been revised to include word processor use in grades 3, 4, and 5. Teachers are expected to teach word processing skills and incorporate the use of word processors into class writing time. Units have been written to accompany the existing curriculum guides to accomplish this, allowing each grade level to concentrate on word processor use at specific times during the year (so that each grade isn't "fighting" for the computer lab at the same time).

Keyboarding instruction/follow through: A two-part keyboarding program has been established at the elementary school. Keyboarding awareness is taught at the primary grades so that students are familiar with key locations, use of both hands, and the proper posture. In grade three, students receive keyboarding instruction for 30 minutes a day for two weeks. Since the third grade program involves modifying existing documents using the word processor, rather than creating new documents, students need only moderate keyboarding proficiency.

All students in grade four (and fifth graders transferring into the school) receive keyboarding instruction and guided practice for 30 minutes a day over five weeks. A minimum goal of 11 words-per-minute has been established though a "hidden" goal of 20 to 25 WPM is desired. Since the curriculum requires that students create compositions using the word processor, students must be able to keyboard at a comfortable and efficient rate of speed. Keyboarding skills are reinforced weekly through fourth grade using short drills and appropriate games. Major keyboarding skills are "refreshed" in fifth grade during the first two weeks of school. All fifth graders create two compositions a month using the word processor.

The fourth and fifth grade teachers carefully monitor the students' keyboarding behavior. Through an intensive workshop and several follow-up sessions, teachers have learned to identify major keyboarding behaviors, know the methods and materials for teaching key strokes, and follow a sequence to build technique, speed, and accuracy. Students receive a grade for their keyboarding technique twice a month .

THE COMPONENTS OF AN EFFECTIVE KEYBOARDING PROBRAM

A variety of literature suggests a sequence for the development of keyboarding:

First *correct technique,*
then *speed,*
and finally, *accuracy.*

Initial keyboarding instruction, therefore, focuses on correct technique. Once technique is rooted in student keyboarding behaviors, teaching methods should be expanded to encourage speed and accuracy. Teachers must be cautioned to this chain of events. Students anxious to keyboard quickly may lack the necessary foundation of technique; poor preparation hampers lasting skill development.

When implementing programs similar to those highlihgted in Programs B and C above, instructional periods should be approximately 20 to 30 minutes in length with one or two short evaluation exercises at the end of each lesson. Teachers should directly teach the concepts and physical reaches of keyboarding as well as monitor student keyboarding technique. Software tutorials should only be used to reinforce skills taught. Based on motor skill development that requires a kinesthetic component, the use of paper keyboards for the teaching of keyboarding are suited to keyboarding awareness only.

In-service programs for teachers who will be teaching keyboarding are necessary. One winning combination utilizes the business educator's competence in keyboarding and knowledge of psychomotor skill development with the elementary teacher's knowledge of the learning patterns and motor skills of young children. Regardless of the teams utilized to present the workshops, each teacher responsible for the direct instruction and/or reinforcement of keyboarding must:

a. *know how to type*
b. know observable keyboarding behaviors
c. have the appropriate materials to teach keyboarding
d. know the way in which keyboarding will be used in that grade level
e. know the baseline keyboarding skills students should have upon entering the grade
f. know the terminal keyboarding skills the students must have upon leaving the grade

RECOMMENDATIONS

- A keyboarding program which will accomplish a minimal goal (10 GWPM) in a relatively short period of time is recommended. If students are to apply keyboarding skills in areas such as word processing or programming, 20 GWPM is an appropriate performance goal.
- Keyboarding should be accomplished through a kinesthetic approach. This necessitates a working keyboarding device to be accessed by each student.
- Keyboarding instruction should be introduced just prior to the time that the skill will be applied.
- The application of keyboarding should be within the context of existing curriculum.
- Keyboarding can be taught in the classroom, cluster, or computer lab. The level of proficiency a student must develop will greatly determine the physical arrangement, hardware, and materials.

Teaching and Computers: Group Oriented Computer Use

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Teaching with Computers means much more than teaching computer literacy in lab settings. It also involves integration in the content areas through *group- oriented* instruction via computers. These strategies for teaching an entire class or groups of students using one or a few computers are rapidly becoming commonplace. Nothing less than a new genre of software is appearing.

1. **How to Teach with Small or Large Groups.** There are at least five modes of effective group instruction using only one or a few computers.

* *group orientation* - this approach works well with small groups or entire classes. Anywhere from 3-7 students may be involved in a computer directed activity, such as conducting a group science experiment. A computer is required for each group. In another variation, an entire class is divided into smaller groups. A single classroom computer calls each group to its screen, one at a time, for participation or decision making.

* *magic blackboard* - this approach allows the software and computer to be used as a "magic blackboard" with an entire class. One computer with a large monitor is used to demonstrate or portray a situation. The instructor uses the software as a fulcrum for discussion, soliciting responses from a class. This 'blackboard' is highly visual, creative and interactive. Earthquakes, scientific experiments, mathematical observations or political phenomena can be recreated in the classroom. The teacher has a pivotal facilitating role.

* *offline/online software* - this approach involves the use of computers as a beginning or an ending in a learning situation. An activity may begin away from the computer, and still be completed on the computer. In HOMETOWN U.S.A., students conduct a marvelous community study, with the computer providing final analysis. An entire class can get involved. A variation involves an activity that begins with the computer, but is completed away from the computer. Such is the case with Mask Parade.

* *hard copy playable* - A high school economics simulation, Cartels and Cutthroats, is conducted entirely away from the computer. Students interact with computer generated reports, never coming directly in contact with the computer. Several programs operate in this fashion.

* *learning center* - This approach involves paired rotation of students around quick computer segments designed for entire classes. Programs such as The Electronic Mailbag and Cactus Factory operate in this fashion

2. Group Computer Technique Doesn't Come Easy. Many teachers and administrators believe that by simply putting a computer in a classroom, quality group instruction will take place. *No!* It requires training, practice, and an eye for appropriate software. Typically, a single computer in the classroom is used for babysitting or reward. The unfortunate result is that the computer activity may have little to do with instructional content. The computer becomes a babysitter, a candy bar, or an 'attraction.'

THE APPLE LEARNING SERIES
FOR
K-12 READING/LANGUAGE ARTS

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Research indicates that the greatest technological need expressed by educators is for software solutions that integrate into classroom curriculum activities. These solutions should address those areas of the curriculum in which educators experience the most difficulties in student performance. They should also be easy for the educator to purchase and to use. To meet this need in the area of Early Langauge, Apple Computer developed the Apple Learning Series: Early Language series. It addresses the critical curriculum area of reading, writing, and language arts. Included in this paper is a description of the goal and purposes of the series, the software included, and hardware configurations recommended for implementation.

How do most people use a computer in their daily lives? They use it as a tool to help them accomplish necessary tasks. As Apple talked with educators about their necessary tasks in the classroom, they discovered that the research indicates the greatest technological need expressed by educators to be for software solutions that integrate into classroom curriculum activities. Educators require that these solutions address those areas of the curriculum in which they experience the most difficulties in student performance. Also, these solutions should be easy for the educator to purchase and to use. In other words, educators are looking for technological solutions that will help them to accomplish the daily tasks they have to complete in educating students.

To meet this need, Apple developed the Apple Learning Series. The purpose of the Apple Learning Series is to support the improvement of instruction through technology. Apple's purpose is not to change or impose curriculum content, only to show how technology can improve learning for today's schools, teachers and students.

The Apple Learning Series: Early Language series consists of a starter set of software, specially selected to enhance teacher instruction in the critical curriculum area of reading, writing, and language arts. The Early Language Series includes highly rated education software ranging in style from drill and practice to word processing. Major education software publishers, in particular textbook publishers who develop software, are represented.

In addition to the software, Apple has developed a Teacher's Manual to enable educators to use this set of software effectively in the classroom. This Teacher's Manual was created to be a working document to which the teacher can add his/her own success experiences. The Manual is intended to provide general information about the software in the series and to be used by the teacher as a reference for integrating the software into the classroom curriculum activities. It gives suggestions for physically arranging the classroom, for assigning software components to students, for teaching communication concepts by using the software as an integral part of the lesson plan, and for adding additional software as needed. It is intended to assist the teacher in implementing the Early Language series into his/her classroom curriculum in his/her own style. Research has shown that the teacher is a critical component for the successful use of technology in the curriculum. Teachers are the key force--learning is most likely too occur when teachers integrate the technology with sound instructional strategies. The Apple Learning Series: Early Language series treats the teacher as the decision maker who has the best information about the group of children being taught and the skills which they need.

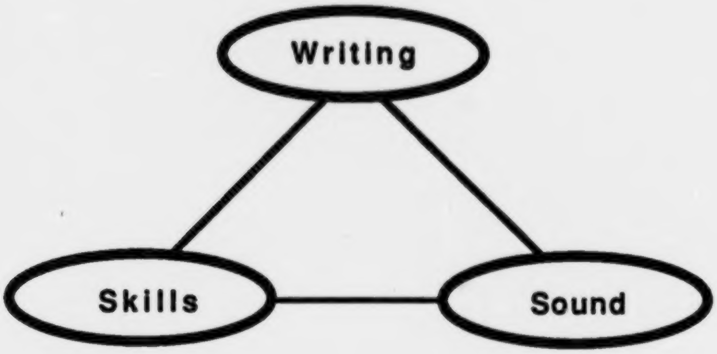
In addition, Apple has provided staff development opportunities for the educators using the Apple Learning Series: Early Language Educators have the opportunity to attend training provided by Apple. Based on the needs of the school and teachers, a school may select from a variety of training alternatives. Each Apple Learning Series bundle contains a certificate which may be used for attendance at an Apple scheduled training class. The primary purpose of the training class is to provide suggestions and strategies for integrating the Apple Learning Series: Early Language software into the curriculum. This is accomplished by explaining and modeling possible classroom activities, and by stimulating creative thinking concerning the use of the software in the classroom. A secondary goal is to help trainees prepare for their own presentation of the class.

An alternative option for use of the certificate is to receive a copy of the Training Manual. With this manual, the school may train teachers as they wish. The manual contains the basic elements necessary for presenting workshops on the Apple Learning Series: Early Language series, as well as background information helpful to the presenter.

Apple Learning Series: Early Language is designed to merge with the existing curriculum. Software and hardware can be incorporated into normal classroom activities to offer a rich array of options for the early language teacher. The Early Language Series is designed so that teachers can make amendments and additions to address the specific instructional needs of their school settings and student populations. The focus is placed on the instructional style of the teacher and his/her growth in instruction through technology.

The flexible instructional design of the Early Language series allows the teacher to adjust it to fit the full range of student developmental needs and learning styles. The unique combination of hardware and software addresses students' learning styles by providing activities for the auditory learner, the visual learner, and the kinesthetic/tactile learner. The variety of software allows the remedial student, the gifted student, and the average student, all, to benefit from the series.

The basics of any communication skills curriculum are speaking, listening, writing, and reading. These basics are addressed in this program through a combination of learning styles: seeing, hearing, and touching.



The Instructional Design of the Apple Learning Series: Early Language series focuses on curriculum integration. The instructional purposes at each of the three stations are:

Skills Station:

- To comprehend that spoken and written words are associated with their component parts.
- To compare and contrast words using a variety of skills.

Sound Station:

- To provide reinforcement in the phonemic composition of words when used within the context of the spoken and written word.
- To provide word attack and comprehension skills

Writing Station:

- To produce words and thoughts with a word processor and to gain further understanding in the connection between the written and the spoken word, using the computer as a tool for instruction.
- To provide children with instruction in penmanship through practice.

A variety of peripherals are used to address the differing learning styles of young children. For those children who learn best through the tactile and visual modes the Muppet Learning Keys and the Touch Window provide the needed stimuli. If a student is primarily an auditory learner, the Echo Speech Synthesizer will provide for his needs. Frequently, in early childhood education, the teacher is faced with the dilemma of having to present the same skills in a variety of ways. These peripherals will help.

Curriculum is a unique entity. It will appear to be the same from one place to the next and yet be very different in its sequence or presentations based on the teacher. With the tools provided in Apple Learning Series: Early Language, the teacher may adapt the program to his/her specific curriculum or the district may decide to create a specific instructional sequence for itself based on the needs or philosophy that exist there.

The Curriculum Matrices in the Teacher's Manual will help to select just the right piece of software to focus on the skill the child needs. Additionally, the district or teacher may wish to use the Curriculum Matrices to help children increase skills which have shown as weaknesses on standardized test scores.

Below are listed the software packages and peripherals used at each station with a brief description of each.

Skills Station

Muppet Learning Keys™ by Sunburst Communications.

The Muppet Learning Keys are designed to serve as an alternative to the standard keyboard by providing an easier way of communicating with the computer. Letters on the Muppet Learning Key are in alphabetical order which helps the student to find them quickly. The keys contain a color pallet, cursor keys, and additional keys to make data input easy for the young child.

Muppets on Stage™ by Sunburst Communications.
Muppets on Stage is used in conjunction with Muppet Learning Keys to provide activities designed to give children practice in letter, number and color recognition; matching of upper and lower-case letters; recognition of initial consonant sounds, and development of one-to-one correspondence.

Muppetville™ by Sunburst Communications.
The ability to identify shapes and develop a sense of directionality is basic to all communication skills. Muppetville guides the student through these activities as Kermit takes a unicycle ride through the town of Muppetville. Information is entered into the Apple //e using the Muppet Learning Keys, the Apple //e keyboard, or the Touch Window.

Muppet Word Book™ by Sunburst Communications..
Muppet Word Book introduces the student to basic concepts of such communication skills such as upper and lower-case letter recognition and consonant and vowel identification. It offers a slate to practice first steps in word processing. Information is entered into the Apple //e using the Muppet Learning Keys, an Apple Mouse, the Apple //e keyboard or the Touch Window.

Writing Station

Touch Window™ by Personal Touch Corporation
Touch Window attaches to the Apple //e color monitor and allows the student to enter data and respond to questions simply by touching the screen. This allows students with no keyboarding experience to use the computer successfully. The Master Touch I disk included in the Touch Window package includes Touch Writer I, a simple word processing program that allows the user to make changes by touching the spot where the change is needed and typing in the new information; and Touch Graphics I, a drawing/graphics program for creating free-hand pictures, charts, cartoons, or other graphics.

Touch 'N' Write by Sunburst, Inc.
Touch 'N' Write software is designed to be compatible with the Palmer Method of penmanship. The student interacts with the Apple //e via the Touch Window as he/she learns about the formation and identification of letters. It is also possible to change the software for use with the Zaner-Bloser method of penmanship.

Talking TextWriter™ by Scholastic, Inc.

Talking TextWriter was developed to facilitate beginning reading and writing skill development. It combines speech synthesis with word processing to provide a multi-modal approach to language arts. The program involves creating text and hearing text by letter, word, line, or page. students can decode unknown words imply by typing them into the computer and hearing them spoken.

Echo IIb by Street Electronics

This speech synthesis card allows Talking TextWriter to provide students with immediate sound reinforcement for an unlimited vocabulary.

Sound Station

Sound Ideas by Houghton Mifflin Company

Sound Ideas is a phonic/word attack skills program that provides the student with self paced experiences involving sounds, letters, and words. Sound Ideas comes with a Teacher's Manual, Student Activity books, disks, stickers, and a class chart for recording student progress. In Sound Ideas, students begin with the auditory discrimination of phonemes. Then they move, as competencies are met, to using this letter/sound correspondence within the context of words, and finally, to the development of more advanced skills through the Word Attack activities.

Echo II+ by Street Electronics

This speech synthesis card allows Sound Ideas to provide students with immediate aural reinforcement both through speech and music.

Other software may be added to this collection as desired.

Research on the use of computers in the classroom provides us with valuable insights into the most effective uses of the technology. Following are highlights from a survey of research on using the computer to teach writing and reading. The survey makes four key points regarding the effectiveness of computers in writing and reading:

1. For young children, learning to write is easier and more enjoyable with computers than with pencil and paper (Bruce & Rubin, 1984; Levin, et al., 1984; Anderson, et al., 1985; Shade, et al., 1986).

2. Synthesized speech output helps young children learn to read and write (Meyers, 1984; Daiute, 1985; Chrosniak & McConkie, 1985; Rosegrant, 1986; Rosegrant, in press).

3. Computer assisted writing enhances the quality of children's writing, and reinforces social skills (Mehan, Maroules, & Drale, 1985; Bruce, Michaels, & Watson-Gegeo, 1985; Rubin & Bruce, 1985; Dickson, 1986; shade, et al., 1986).

4. Children can substantially improve their writing with computers (Levin, et al., 1984, Bruce, & Rubin, 1984; Riel, 1985).

5. The benefits of computer use in early language development depend on the learning environment created by the teacher (Levin, et al., 1984; Bruce & Rubin, 1984; Bruce, Michaels, & Casden, 1985; Bruce, Michaels, & Watson-Gegeo, 1985; Piel, 1985; Balajthy, McKeveny, & Lacitignola, 1986).

The Apple Learning Series: Early Language series can be run on any member of the Apple // family. Hardware may be provided from existing resources of from new equipment as needed.

Minimum configuration consists of:

•3 Apple //e Color Classroom Systems (Part #A2P2170)

Each Apple //e Color Classroom system consists of an Apple //e 128K CPU, and Apple Color Composite Monitor //e, one Apple 5.25 inch Drive, an Apple //e Accessory Kit, and an Apple // Utilities Guide.

OR

•Apple IIGS 512K Professional System (Part # A2P6014) or Apple IIGS 512K RGB Professional System (Part # A2P6015) may be used rather than Apple //e Systems, if desired. However, the software currently being delivered in the Apple Learning Series: Early Language bundle does not use the built-in sound capabilities of the Apple IIGS personal computer. You must still use the Echo II speech synthesizer cards as noted for the Apple //e.

•1 ImageWriter II with Apple //e Cable and Super Serial Card (Part #A9P0331)

This printer bundle contains one ImageWriter II, a Super Serial Card, and one Apple //e Cable, all the items necessary to connect the printer to the computer. The ImageWriter II will support the color ribbons needed to print the color graphics in several of the packages.

Optional Hardware

•AppleMouse //e (Part # A2M2070)

Some of the software allows the mouse to be used as an alternative input.

This usage of the computer is to its most realistic advantage: as a daily, vital part of the learning process. Using the Apple Learning Series: Early Language, the teacher now is able to integrate technology into the curriculum fully by blending computer activities into the natural flow of classroom instruction.

This is how the average person uses the computer on a daily basis. It only makes sense that students should be using the computer in the same way in their daily learning activities.

If you would like more information on the Apple Learning Series: Early Language series, you may contact one of the following people:

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THE ROLE OF COMPUTERS IN DEVELOPING THINKING SKILLS

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ABSTRACT OF PRESENTATION: The purpose of this presentation will be to identify computer software that can be used to help the teachers in their attempt to introduce and reinforce thinking skills in their daily classes. Participants will be exposed to programs which are especially helpful in calling attention to these skills. In order to make this practical, the participants will go through a basic step-by-step process so they can understand how to use the software most effectively.

The goal of helping students become better thinkers in not new to education nor is it new to the curriculum as a whole. What is new, however, is the comparatively heightened interest in the development of thinking skills per se. Until recently, many teachers felt they challenged all students to think when they asked them questions and assigned writing tasks. The teachers gave tests in which the students had to "think" and recall what he/she had memorized, and was passed or failed on the basis of that thinking and recall. These same students go out and encounter various situations outside of their classroom setting. They are to relate to others, purchase goods, get a job. All of these experiences demand thinking if they are to be successful. They are to remember things. Now, however, things are changing for these same students. With computers in almost every workplace, we are beginning to realize that people no longer need to have perfect memories. Since the computer has such a fantastic memory, the employee can spend quality time thinking rather than memorizing facts and figures. People are now prized for their human quality of thinking but our schools are still testing students on their ability to recall facts. No one will deny that a certain amount of memorized information is essential. We are not preparing students to enter the world of work if the students have not developed thinking skills to the degree that they become skillful thinkers.

There are many definitions of thinking. In its broadest sense, thinking is the search for meaning based on truth. It is not a vague process nor is it a one-dimensional endeavor. Thinking is a complex phenomenon which involves one or more cognitive operations, certain kinds of knowledge, and certain attitudes or dispositions. Experts agree that thinking consists of some type of mental activity. Neither thinking nor the teaching of thinking occurs in a vacuum.

Many educators wonder if it is possible to teach students how to think. To the extent that thinking is a skill, it is teachable through drills, exercises, or problem solving in an area. It seems that teachers have been assigning these exercises and drills for years without achieving the desired result. It is becoming more clear that merely providing exercises is not sufficient. A much clearer understanding of the proper types of problems and exercises needs to be reached not only by teachers but also by the educational community as a whole. Students' understanding of what is expected of them will also affect the success of such endeavors. Wven after the principles and methods of teaching the skills of thinking are understood, there remains the problem of getting students to use these skills. One must ensure that these same skills become part of the students' normal intellectual repertoire.

Making inferences, recognizing assumptions, making deductions, interpreting, and the evaluations of arguments are inherently embedded in the process of thinking. One will find that most researchers will list the following steps as the ones most frequently used in thinking: 1) recognizing a problem; 2) formulating an hypothesis; 3) gathering pertinent facts or data; 4) testing the hypothesis; and 5) drawing conclusions.

Thinking can be developed through appropriate classroom practices, but teachers must remember that this development does not take place automatically. They need to direct their teaching toward this end. With the advent of computers in the classrooms, the question arises whether or not computers can be used as a means to develop thinking skills. To answer this, one must look at the types of software that are available to the teacher and note what is to be accomplished by each type that is in accord with developing thinking skills.

TYPES OF SOFTWARE THAT HELP DEVELOP THINKING SKILLS

The skill or drill program is probably the most common educational program. In such a program, the computer delivers certain information and the user responds with either correct or incorrect answers. Some skill activities include identifying the sequence of events or matching words to their meanings. Many mathematical and visual discrimination programs are also drill programs. Actions or processes that indicate thinking in these programs are the following: 1) observing the accumulated facts that are related to the overall problem; 2) making comparisons when observing two or more objects; and 3) classifying or purposeful grouping on the basis of relationships. While drill and practice may be overused, few deny that such routines are inescapably a part of education, providing the necessary reinforcement for learning skills and content material.

One type of software that is of particular interest to the development of thinking skills is simulation. A simulation is a model of a real or an imaginary world. It can be placed in the past, present, or future. Each simulation is based upon components called variables. Simulations develop intuitive and analytical thinking. Success in a simulation depends largely upon the ability to foresee and solve the problems to be encountered. In the well-known program OREGON TRAIL, for example, if on one occasion the failure to spend money on medical supplies leads to their wagon train dying because of illness, the next time the students will plan for this problem.

Since simulation programs replicate real world problems or situations, the student is given certain data to work with and must use logic and decision-making skills to solve or manipulate a problem. For instance, when working LEMONADE STAND, a student sets up a lemonade stand and decides how much lemonade to make, how much money to spend on advertising and so forth. The computer can introduce other varibales that would require additional problem-solving skills. Many games are simulation programs, engaging the student in thinking skills such as organizing data according to a logical sequence, making supporting statements and choices, considering outcomes and alternatives, and decision-making. All of these steps take time. The computer is self-paced, infinitely patient, and it maximizes the potential for learning and developing thinking skills.

Using Computers in the Primary Grades

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ABSTRACT

Microcomputers are found in most schools and many teachers have had a course or a series of workshops to familiarize themselves with the computer. Questions today are not focused as much on whether computers have a place in the schools or on whether all teachers need to become computer literate, but rather on the appropriate use of the microcomputer in the classroom. This paper directs attention toward integrating mircocomputers into the curriculum of young children.

Microcomputers are no longer strangers in primary classrooms. Most schools have at least one computer in each room or have a Computer Lab where students go for formal computer instruction. The computers are there, but how they are used is frequently a concern. The attitude of the teacher who involves her students with computers is very important. Some teachers see computers being used as "rewards for good behavior", or for the use of bright students who complete their work, or as an extension of workbook drill and practice. Worse yet would be the attitude that the computer is something for young children to "play" with and from which we do not expect any learning to take place.

The computer is best looked upon as an integral part of the classroom - another tool for all children to use in their learning. Looked upon this way, the computer is not seen as a threat to other "hands on" experiences that are so important to young children. The only way that computers will ever take the place of blocks or other manipulative learning experiences is if we let them. Computers should fit into the balance of activities in the classroom.

When computers are linked to the curriculum, all children will have the opportunity to use them. If we see the computer as a learning tool, we no longer look at it as inappropriate for limited English proficient students, slow learners, or very distracted youngsters. When appropriate software is integrated into the curriculum, all children will profit from technology that encourages thinking, trial and error, creativity, instant feedback, and constant patiemce.

Current research has indicated several strong advantages for young children who interact with computers. One of the many advantages is the growth in language. Young children using a word processor were observed to socialize considerably more with each other than children writing stories with paper and pencil. Observations of young children using computers have also indicated that the children were willing to experiment with answers, stayed on-task longer, and appeared to take great pride in hard copy of their work.

One key to children's success and learning with the computer is the selection of approriate software. The software should involve the student with high interaction, be process oriented, enhance a student's sense of control, foster and satisfy curiosity, and be accurate in all concepts presented. Drill and practice is beneficial for many children, but they will also benefit from using the Turtle to think with in LOGO and will be encouraged in their writing when using a word processor. There is a variety of computer applications available to teachers of young children which will enhance and extend the curriculum. The task for the teacher is to search out appropriate software and then encourage the students to explore its potential.

Using the Brick by Brick Reading Program

Virginia Morrison, Computer Consultant
Bay City ISD

A brief overview of Brick by Brick Reading Program, Level 1 implemented in a Reading Center Pilot Program at Pierce Elementary School will be presented. Aspects of the application include correlation of the program to curriculum objectives, individual student activities, record keeping and writing activities which encourage communication. A hand-out includes a summary of the program and samples of writing activities.

During this current school year, the Reading Center in Pierce Elementary School, Bay City ISD has piloted the Brick by Brick reading programs, Level 1. All three modules, including vocabulary, use of words and comprehension were used. In addition, vocabulary activities were part of a center in a single classroom.

As a series of software programs, Brick by Brick was used to supplement basic reading development. Context and meaning were stressed through vocabulary/ picture correlation and the use of phrases. The series covered words based on both the Durr and Dolch list. The controlled vocabulary was used in three categories: vocabulary development, use of words and reading comprehension.

Implementation of a software program during a pilot program period gives important information on how content, skills, records and correlated activities fit into your curriculum and designated objectives.

This presentation will cover details from the pilot project on:

**correlating student skill needs to computer aided instruction
**managing the students in the center
**monitoring individual student progress to insure success
**record keeping
**correlation of skills to curriculum objectives
**expanded reading activities
**writing activities to encourage communication of ideas
**an additional application included using some of the computer aided instruction in a single classroom as a center activity

A hand-out will include a summary of the pilot program and sample writing ideas.

CAI in Transitional (Developmental) First Grade Classrooms

Jacqueline D. Coley, Teacher
Bay City ISD

An explanation of curriculum and software used in a transitional first grade classroom using three Apple IIes.

Bay City Independent School District in the 1986-87 school year placed three Apple IIes in a first grade "transitional" classroom to aid instruction in all subject areas. The main goal was to evaluate and adapt student learning in order to identify and prevent future learning problems. Other goals were to motivate students, encourage regular attendance, and build students' self concepts. Students were selected for this class on a basis of kindergarten test scores (ITBS reading and Kindergarten Pre-Reading assessments). Seventeen students were enrolled and participated in the class. Of the 14 students still in BCISD schools, most are now (1987-88) in regular 1st grade classrooms, function within class levels.

This presentation will include:

- assessment of progress and advantages of curriculum
- development of curriculum within all major subject areas
- explanation of classroom management and scheduling
- evaluation of program changes in second year
- listing of software by skills taught with each program
- open discussion to answer questions and share ideas

The excitement grows as students become more skilled and remain motivated. All students benefit from the individualized learning provided in this program.

WRITING TO READ

E. Rachel Lane, Ph.D.

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Ext. 2583

In contrast with the traditional approaches to beginning language arts instruction that have been reinvented time and again in the history of education, Writing to Read represents a breakthrough. Although each of the components of Writing to Read has some historical antecedents in language arts education, it is the combination of components that sets it apart from all other programs. The approach taken in Writing to Read involves a unique and powerful combination of: (a) a language experience approach, (b) an early emphasis on writing, (c) the use of phonemically based spelling, and (d) an application of microcomputer technology. The program creates a multi-sensory, multi-dimensional language center that is specially tailored to the needs of children. The environment in the Writing to Read Center is highly active and motivational, with children moving through several learning stations designed to stimulate and hold their interest as they learn. The program builds on students' natural language development and provides a logical and consistent format which allows students to turn their language into print they can read.

By the time students enter school, they already possess two important prerequisites needed for learning - curiosity and a basic level of communication skills. Writing to Read is a computer-based instructional system that helps teachers tap these key resources. It combines educational and technological advances in a uniquely effective approach to beginning writing and reading in the schools.

Building on each child's natural language growth, Writing to Read, which was developed by noted educator, Dr. John Henry Martin, helps develop the writing and reading skills of kindergarten and first grade students. It is a multi-media educational system designed to teach children how to write what they can say and read what they have written.

This method builds writing and reading skills before a child has mastered the intracacies and inconsistencies of spelling in the English language system. Research indicates that most kindergartners enter school with a speaking vocabulary of more than 2,000 words. Writing to Read uses a selected set of 42 phonemes, which are letters and combinations of letters that represent the sounds of spoken English. After learning the entire set, students can write phonemically any word within the English language they can pronounce. At the beginning of Writing to Read instruction, a distinction is made for students between two types of spellings: "sound" (phonemes) and "book" (standard spelling). Throughout the program, phonemic spelling is accompanied by standard "book" spelling which is taught in regular classrooms. After learning basic writing and reading skills with a consistent phonemic system, students better understand the peculiarities of standard spelling.

For approximately one hour a day, children come to the Writing to Read Center, where they rorate through several learning stations: the Computer Station, the Work Journal Station, the Writing/Keyboarding Station, the Make Words Station, and the

Listening Library Station. At the Computer Station, children work in pairs at a personal computer equipped with a speech attachment that enables the computer to "talk" to them. With its natural-sounding "voice" and its interactive programming, the computer offers each student self-paced instruction. The children spend about 15 minutes at the computer, interacting with their partners and responding to instructions given by the computer "voice." During 10 learning cycles, students respond to exercises presenting the 42 phonemes within the context of familiar words. Upon completion of all cycles, children are acquainted with writing and reading the sounds that make up spoken English.

At the Work Journal Station, the children listen to a taped lesson for reinforcement of the sounds they learned at the computer. During a cycle of study, children mark their progress on the back page of the work journals. Following the completion of a cycle, students take their work journals home for discussion of their progress with parents. This parental reinforcement is a natural extension of the Writing to Read program's intent to generate excitement for learning.

The Writing/Keyboarding Station has two learning areas: the writing table and the word processing area. At the writing table, students have easy access to various writing tools with which to experiment with the discoveries they are making about letters and sounds. At the keyboarding area, personal computers are used as word processors in order for young learners to have a faster, easier means of writing than hand lettering, which is often a laborious and time-consuming task for young children. Without fretting over creating each symbol by hand, they build speed in letter recognition, increase in writing fluency, and can concentrate on what they want to say. This method encourages, therefore, a focus on thought rather than the motor skills needed for writing long-hand. Soon after their introduction to written language, students can begin to view writing as a means of communicating a thought or message. At this station, many kindergarten and first grade children progress through the writing states to the level of actually writing stories and compositions.

After hearing and seeing words in print and at the computer, students discover that they can recombine letters to form new words. Through games and hands-on use of materials like clay, sand trays, wooden letters, pipe cleaners, letter and word games, etc., students investigate new combinations of letters and words at the Make Words Station. Through the use of a variety of manipulatives, the children learn that the letters representing the phonemes can be recombined in many ways to make different words.

At the Listening Library Station, children listen to carefully selected children's literature while they follow along in the text. This station is designed to familiarize students with words and to give them a chance to match speech with written English. In addition, when the children analyze the words in these stories to identify them, they begin to notice that some words are not spelled in books the way they are written in "sounded-out" spelling. Gradually they become familiar with book spelling and include it in their own writing.

Writing to Read provides, thus, an interrelated environment where children become excited and motivated about learning to write and to read. Their success and the focus on creative self-expression through written language insures a high level of enthusiasm. Teachers in Writing to Read Centers across the country are reporting that with this program, not only do children learn to read, but they clearly surpass their fellow students in written expression. Test results nationwide are indicating that Writing to Read students are excelling in reading and writing skills as measured by both standardized tests and tests of writing ability. The conclusion: Writing to Read works!

A Review of Microcomputer Applications In the English Classroom

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Computers have become inextricably entwined in all of our society's institutions. In the institution of education, the computer is a valuable instructional tool which offers more variety in learning tasks. More specifically, "the introduction of microcomputers into the schools offers English teachers and students the opportunity to use the microcomputer to improve the teaching and learning of English" (Mizener, 1985, p. 89). Reported studies concerning the use of computers to assist with the instruction of English are currently flooding educational research literature. It now appears that the English teacher should no longer be concerned with whether or not to use a microcomputer in the classroom; instead the English teacher should be more concerned with how he or she can utilize the microcomputer in the classroom. As a result, this study is designed to explore the literature, the activities, and the computer programs available to the English teacher.

More specifically, for the English teacher, the use of the computer can change the cognitive process of learning in English (Mizener, 1985). With the use of word processing, tutorials, and drill and practice programs, students can learn at their own pace and in their own style. The use of the computer in the classroom marks the movement away from group-based learning towards interactive individualized learning. Therefore, the English teacher should utilize the computer to personalize learning in the most efficient and productive manner. Consequently, the goal of this paper is 1) to critically examine educational research on the use of computers in teaching English; and 2) to suggest possible applications of the microcomputer in the teaching of writing, vocabulary, spelling, and reading. The major thrust of this paper is to give teachers, who intend to use the microcomputer in their classroom, many more innovative ideas for uses of the computer.

A STUDY OF THE EFFECT OF KEYBOARDING AND WORD PROCESSING ON THE WRITING SKILLS OF AT-RISK STUDENTS

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The number of young people not graduating from high school and what educators should do about this has become a national concern. The most cited reason for these students leaving school is a negative experience, most frequently with poor grades. One academic problem area with the low achiever, who is often the at-risk student, is in writing composition. Because a major reason for dropping out of school is bad grades, if achievement in writing can be accomplished, the carryover into other academic areas might improve overall success. The purpose of this study is to examine the effect of teaching keyboarding followed by word processing on holistic writing skills of at-risk students. It is further hypothesized that these writing skills will improve after this intervention. The population targeted in this study is fourteen high school freshmen from Angleton High School in Angleton, Texas. These students will be involved in this study for the 1987-88 school year. The Iowa Test of Basic Skills - Writing Supplement will be given as the pre and posttest assessments.

The number of young people not graduating from high school and what educators should do about this has become a national concern. This is demonstrated by a number of states mandating that local districts provide programs addressing these "at-risk" students. Of the numerous districts that do offer special classes or programs for at-risk students, very few record or report their findings concerning the effectiveness of these efforts. There is a serious need for these districts to document and publish their findings in order for others to establish more effective programs. The lack of information as to what works and what does not is detrimental to making significant progress in lowering the dropout rate.

One academic problem area with the low achiever, who is often the at-risk student, is in writing composition. Many at-risk students have trouble communicating verbally, much less in a grammatically correct composition. Because a major reason for dropping out of school is bad grades, if achievement in writing can be accomplished, the carryover into other academic areas might improve overall success.

The purpose of this study is to examine the effect of teaching keyboarding followed by word processing on holistic writing skills of at-risk students. For this study an at-risk student is defined as a high school freshman identified as a potential dropout because of the California Achievement Test (CAT) reading scores being three to four years below grade level, excessive absences, and/or excessive discipline reports. Holistic writing skills emphasize the process of writing rather than specific mechanics.

Research evidence suggests an urgent need for applied research data and/or data on program effectiveness with dropouts. More specifically, further research into the use of word processing having prior keyboarding experience seems to be indicated.

Therefore, it is hypothesized that the holistic writing skills of at-risk students will improve after learning keyboarding and the use of a word processor.

The population targeted in this study is fourteen high school freshmen from Angleton High School in Angleton, Texas. These students were assigned to a special class for studnets identified as "potential dropouts". The students were identified by their 8th grade teachers and principals with the aid of CAT scores, amount of absentees and/or tardies, and amount of discipline referrals.

At the beginning of the school year, a letter was sent home explaining that this study would involve learning how to keyboard, or touch-type, on the computer followed by learning a word processing program. After becoming familiar and comfortable with the word processing program, writing skills would improve because of the ability to use this tool. A consent form was attached and signed by the parents allowing their child to participate in this study.

The ITBS - Writing Supplement was given to assess a base level of writing skills. The students worked through a commercial tape-driven keyboarding program with extra practice offered from typing texts. The students spent approximately 15-20 minutes per day on the keyboarding. When the students reached a level of approximately 10-20 words per minute, they were introducted to The Bank Street Writer word processing program.

Throughout the keyboarding section and for the rest of the year the students will write in a daily journal and write short reports from reading magazine articles in order to keep up their narrative writing skills. Group discussions on books read, current events and issues will be used to improve verbal skills, hoping to improve general communication skills.

At the end of the year the ITBS - Writing Supplement will again be given to determine if significant improvement was made.

The author will discuss in her presentation specific activities and programs used during the year as well as problems and progress she can observe five months into the study. Final results will not be available until summer, 1988.

Can We Talk? Speech Supported Instruction on the Apple IIGS

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ABSTRACT

While educators readily acknowledge the potential of integrating speech with computer-based instruction, applications have been slow to develop. Early attempts at implementing speech have been expensive because of the need for special add-on equipment. In addition, the quality of the speech offered to date has not met educators' expectations. New technologies have been developed recently, however, which make it possible to improve significantly the quality of speech delivered by a computer with no additional hardware requirements. The Audio Record and Playback System (ARPS) is one such tool for the Apple IIGS which allows educators and parents to create software that provides a computer-based learning environment complete with auditory as well as graphics and text. This means that for the first time educators or parents will have at their disposal a low-cost tool for creating or translating specialized vocabularies and reading selections into voice-assisted tutorials to meet the needs of a diversity of learners.

INTRODUCTION

The Audio Record and Playback System (ARPS) is designed to address two important problems that have plagued the development of computer-generated speech systems: 1) the quality of speech has been inadequate for many of the important applications of speech in computer-based instruction, and 2) to date, computer-generated speech has required additional hardware which represents a major additional cost in purchasing computer-based systems. In September of 1986 a grant was made available from the Department of Education which enabled Learning Technologies to take advantage of a new technique known as "voice-store-and-forward" to create a software and hardware tool that will allow users, primarily educators, to record and edit voice and sound files so that they can be incorporated into lessons along with graphic and text reinforcement. These audio-enhanced lessons can then be used to help meet the needs of beginning readers or many "special" populations of learners such as the learning disabled, visually impaired, nonvocal, speech delayed, and physically handicapped.

The specific software application developed to demonstrate the potential of the prototype ARP System addresses the acquisition of sightword vocabulary. This application was chosen largely because of the importance of auditory reinforcement in the reading process. High quality voice and sound that is reproduced by a computer can play an important role in individualizing the tedious process of repetition and reinforcement that is a necessary part of strengthening sight-to-sound correspondences which are so important in beginning reading.

BENEFITS TO INSTRUCTION

Making a tool such as the ARPS available for developing instructional applications in reading and language acquisition has a variety of benefits:

1. Provides educators or parents with a flexible, low-cost tool for creating or translating specialized vocabularies and reading selections into interactive, voice-assisted tutorials to meet the needs of a diversity of learners including beginning readers, non-English speaking learners, adult non-readers, and learners with severe physical sensory and cognitive handicaps.

2. Reduces the cost of software application efforts by placing the ability to customize vocabularies and reading selections in the hands of parents and educators. These applications can be individualized to meet a learner's current needs and to adapt lessons to the continuous intellectual growth of the learner.

3. Offers the ability to reproduce sounds, words, phrases, and even short sentences exactly as they are spoken by a human speaker, an important feature in promoting correspondence between a learner's spoken vocabulary and text.

4. Uses graphics to create a context in which speech and text can be learned more readily. This context becomes the experience base for learning and provides a system for cueing learning and relating it to prior experiences.

DESCRIPTION OF PROGRAM COMPONENTS

The Audio Record and Playback System has three essential components: 1) a prototype circuit board which is necessary to facilitate the digitizing and compression of voice and sound data so that it can be stored and recalled later from the floppy disks, 2) utility software that reproduces voice and sound data disk files in a software only format, 3) application software that demonstrates the utility of the voice and sound reproduction tool in an instructional application.

The truly unique feature of the ARP System is that it not only provides a tool for creating computer-based lessons that incorporate graphic, sound, and text stimuli and reinforcement but it also requires no additional hardware for the playback. This means that once lessons have been created using the ARPS, they may be used on any standard Apple IIGS system without the addition of speech synthesis or speech reproduction devices of any sort. These lessons can then be used in teaching a broad range of subject areas as diverse as speech therapy, spelling, foreign language and English as a second language instruction, medical and dental education, and teaching adult non-readers in the armed forces or in job training courses.

Computer Integration in the Language Arts Curriculum

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The purposes of this workshop are to explore the writing process and to provide a variety of ideas for integrating computers, through the use of a word processor, into the exsisting Language Arts curriculum. A collection of activities from various sources will be presented. Emphasis will be placed on how to incorporate the computer in the writing process; with, a special focus on TEAMS writing.

The integration of the computer in the language arts curriculum could possibly be one of the most revolutionary trends of this decade. Fischer & Fischer (1986) describe word processing teçhnology as "... the most powerful workspace for writing and writing instruction since the advent of written expression." Through the use of computers and word processing software teachers are able to introduce their students to writing and develop needed computer literacy skills at the same time. According to Toch (1982), microcomputers when programmed as word processors are a potential boon to students' writing and thinking skills. Because of current efforts by most schools to develop students that are able to think and create rather than to respond to preselected options, the computer as a word processor, has the potential to become the most significant educational tool of this decade.

The writing process consist of five basic steps. Each step is an integral part of composing communicative written text.

STEP 1 - PREWRITING During the prewriting phase the writer is introduced to a topic and a writing task is assigned. At this point the writer must explore his/her topic in a variety of ways. Researching, brainstorming, outlining, discussing, and clustering are activities that take place during this phase.

STEP 2 - DRAFTING During the drafting phase the writer puts his thoughts and ideas into writing. Using the computer in the drafting phase the writer is free to compose his/her ideas and thoughts without paying special attention to mechanics, neatness, pensmanship and appearance. Thus, freeing the writer to focus more closely on the content of his/her work.
STEP 3 - REVISION During the revision phase the writer rethinks the content of his/her work, then, physically rearranges and reorganizes his written thoughts and ideas. In this stage the content of the words is made as communicatively clear as possible.
STEP 4 - EDITING/PROOFREADING During the editing phase the writer fine tunes the the written product. Emphasis is placed on the mechanics of writing in this phase.
STEP 5 - FINAL COPY At this point the finished product is prepared for viewing.

The nature of the writing process makes the computer, in the word processing mode, an ideal instrument to facilitate better written communication. Employing the computer to enhance, reinforce and even teach the writing process has a number of advantages; the foremost being that computers make the writing process easier and faster. The use of the computer in each phase of the writing process seems to simplify the task of putting words on paper. Thus, allowing the writer to focus more on the content of his/her work without a lot of effort in the areas of handwriting and mechanics.

Hoot (1984) indicates that the use of computers facilitates a more conducive writing environment and alleviates the technical drudgery of writing. Other benefits of using the computer in the writing process include:

1. The number of problems and frustrations children experience when they write with paper and pencil is greatly reduced.
2. Revision of work is completed more willingly.
3. Students tend to write longer stories.
4. Word processing encourages collaborative and comparative writing.
5. Motivation to write is greatly increased.
6. Time spent on task is augmented.

With the help of computers writing becomes the creative, artistic process of communicating ideas and thoughts for a variety of purposes and not an awesome, dreaded task.

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Fischer, C. & Fischer, O. (1986). Personal Publishing: The Microcomputer Transformation of Written Composition. Proceedings of the Sixth Annual TCEA State Conference, 6, 216-221.

Toch, T. (1982). Hugh potential seen in largely undeveloped field: Sophisticated microcomputers used to teach students to write. Education Week, 2, 13.

COMPUTERS AND COMPOSITION:

Integrating Computers into the English Curriculum

Elizabeth C. Presley
Plano Senior High School
Plano, Texas

Sharon L. Larned
Plano East Senior High
Plano, Texas

Karla K. Burkholder
Instructional Technology Department
Plano Independent School District
Plano, Texas

The presentation will include a discussion of the place of the computer in the English curriculum and how to integrate it into your classes. One topic of discussion will be lab configuration, including descriptions of class sizes, selection and arrangement of hardware, scheduling of lab time, and class management. A second topic will be discussion of software including evaluation, selection and integration. The focus here will be on word processing and related composition application programs. The final topic of discussion will be practical application of the composition lab into the English curriculum.

The core of the one hour presentation is lecture and discussion. Sample unit plans and lesson plans will be provided.

COMPUTERS IN ENGLISH/LANGUAGE ARTS: THE ONLY WAY TO WRITE!

Teri A. Coburn
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Word processors have proven time and time again that they are valuable tools for teaching the writing process. Students love to write and even revise and proofread on a computer. This session will provide participants with detailed writing assignments for grades 6-12 which have been designed and developed for use on a word processor. Session participants will receive handouts detailing the types of writing assignments used on each grade level as well as the methods used for integrating the use of the word processor into the writing process.

The secondary schools of Cypress-Fairbanks ISD are divided into junior high school for grades 6-8 and senior high school for grades 9-12. Every sixth grader participates in a four-week word processing unit called Easy Script which was designed for use with the junior highs' Commodore 64 word processing program. This session will provide participants with single-paragraph descriptive and expository writing assignments designed especially for sixth grade students. Seventh and eighth grade language arts teachers schedule their students into the word processing labs to compose a variety of single-paragraph writing assignments as well as multi-paragraph compositions including original stories and research reports. Session participants will receive detailed instructions for using the word processor to create a short story on the seventh grade level and a research report on the eighth grade level.

On the high school level, Cypress-Fairbanks ISD has instituted the very exciting AT&T Framework program for its senior high word processing labs. Each grade level 9-12 has its own particular writing assignments ranging in sophistication from single-paragraph essays to the more complex literary research papers. Session participants will receive detailed instructions for compositions designed by high school teachers for use in the word processing lab. In total, each participant will receive seven (7) writing assignments, one for each grade level 6-12, that have been specially designed and tested by English/language arts teachers for use on the word processor.

CREATIVE WORD PROCESSING IN THE CLASSROOM

Lou Devenport, Consultant
Regency Educational Systems, Inc.
4951 Airport Pkwy, Suite 600
Dallas, TX 75248

Turn your word processor into a process writing tool in grades K-12 using MECC software, "Write On!" from Humanities Software, and "The Writing Workshop" from Milliken Software, you will practice writing stories, poetry, letters, journals, reports, and essays in a carefully sequenced manner in a scope and sequence that supports the process approach to writing.

During this workshop you will learn to:

List some of the potential problems in the use of computers for teaching writing.

Describe writing as a recursive process

Understand the importance of optimizing both human and computer contributions in the writing process

Use your skills in a carefully sequenced manner on tasks including prewriting, organizing, composing, revising and editing and publishing.

This should help the teacher understand the importance of optimizing both human and computer contributions in the writing process. Computers can improve writing, but only if teachers design curricula that focus on their strengths. Lessons will be distributed which speak to this process.

Computers can provide assistance with spelling, grammar and revision. In fact, the chief strength of writing with a word processor is easier revision. Because revision is easier, students enjoy writing more and learn to approach it as a step-by-step process.

Keyboarding -- A Language Arts Activity With 3rd and 4th Graders!

William F. Kernahan
Director of Customer Support
Sunburst Communications, Inc.

Research indicates that incorporating keyboarding activites into the curriculum will accomplish more that the development of proficient typists — it will also increase a students skill level in spelling, composition, reading and vocabulary. This workshop will involve the participants in a hands-on activity designed for 3rd and 4th grade students.

Keyboarding is becoming a mandated computer literacy skill in many states. It is important to incorporate it into the curriculum in a practical and integrated fashion — as opposed to a skill learned in isolation.

Type To Learn, from Sunburst Communications, Inc., has been designed to integrate keyboarding into the language arts curriculum. Participants will use the program both as a teacher (in setting up the management system) and as students.

The session will conclude with a discussion of implementation strategies — including teacher training ideas and classroom vs. lab installations.

Ms. Piggy Learns To Use
A Word Processor--
With Pictures

William F. Kernahan
Director of Customer Support
Sunburst Communications, Inc.

The computer as a tool to aid in learning is used at all grade levels. It has proven to be very useful at the K-2 level in developing language skills. Using a word processor to manipulate words encourages a WHOLE LANGUAGE approach to learning to read and write. This session will involve the participant in a hands-on activity designed for 1st grade students.

A new word processor for K-1 students will be introduced and used in a variety of language related activities. The program is MUPPET SLATE and it will be used on the Apple II in conjunction with the MUPPET LEARNING KEYS.

Participants will flip through a alphabet picture book to illustrate their creative writing; they will create Rebus writings; they will save and print their work — with or without borders. They will accomplish all of this while participating in a series of language arts lessons that promote "writing as thinking."

The session will conclude with a transition into the new 20 column version of MAGIC SLATE II. A series of language arts activities appropriate for 2nd grade students using the new FROZEN PROMT and FILL-IN-THE-BLANK features of MSII will be explored.

THE APPLE LEARNING SERIES
FOR
K-12 READING/LANGUAGE ARTS

Barbara Secrest Nelson, K-8 Solutions Manager
Apple Learning Series
Apple Computer, Inc.
Cupertino, California

Barbara Baxley, Education Training Registrar
Apple Learning Series
Apple Computer, Inc.
Dallas, Texas

Research indicates that the greatest technological need expressed by educators is for software solutions that integrate into classroom curriculum activities. These solutions should address those areas of the curriculum in which educators experience the most difficulties in student performance. They should also be easy for the educator to purchase and to use. To meet this need in the area of Early Langauge, Apple Computer developed the Apple Learning Series: Early Language series. It addresses the critical curriculum area of reading, writing, and language arts. Included in this paper is a description of the goal and purposes of the series, the software included, and hardware configurations recommended for implementation.

How do most people use a computer in their daily lives? They use it as a tool to help them accomplish necessary tasks. As Apple talked with educators about their necessary tasks in the classroom, they discovered that the research indicates the greatest technological need expressed by educators to be for software solutions that integrate into classroom curriculum activities. Educators require that these solutions address those areas of the curriculum in which they experience the most difficulties in student performance. Also, these solutions should be easy for the educator to purchase and to use. In other words, educators are looking for technological solutions that will help them to accomplish the daily tasks they have to complete in educating students.

To meet this need, Apple developed the Apple Learning Series. The purpose of the Apple Learning Series is to support the improvement of instruction through technology. Apple's purpose is not to change or impose curriculum content, only to show how technology can improve learning for today's schools, teachers and students.

The Apple Learning Series: Early Language series consists of a starter set of software, specially selected to enhance teacher instruction in the critical curriculum area of reading, writing, and language arts. The Early Language Series includes highly rated education software ranging in style from drill and practice to word processing. Major education software publishers, in particular textbook publishers who develop software, are represented.

In addition to the software, Apple has developed a Teacher's Manual to enable educators to use this set of software effectively in the classroom. This Teacher's Manual was created to be a working document to which the teacher can add his/her own success experiences. The Manual is intended to provide general information about the software in the series and to be used by the teacher as a reference for integrating the software into the classroom curriculum activities. It is intended to assist the teacher in implementing the Early Language series into his/her classroom curriculum in his/her own style. Research has shown that the teacher is a critical component for the successful use of technology in the curriculum. The Apple Learning Series: Early Language series treats the teacher as the decision maker who has the best information about the group of children being taught and the skills which they need.

In addition, Apple has provided staff development opportunities for the educators using the Apple Learning Series: Early Language. Educators have the opportunity to attend training provided by Apple. Based on the needs of the school and teachers, a school may select from a variety of training alternatives. Each Apple

Learning Series bundle contains a certificate which may be used for attendance at an Apple scheduled training class. An alternative option for use of the certificate is to receive a copy of the Training Manual. With this manual, the school may train teachers as they wish.

Apple Learning Series: Early Language is designed to merge with the existing curriculum. Software and hardware can be incorporated into normal classroom activities to offer a rich array of options for the early language teacher. The Early Language Series is designed so that teachers can make amendments and additions to address the specific instructional needs of their school settings and student populations. The focus is placed on the instructional style of the teacher and his/her growth in instruction through technology.

The flexible instructional design of the Early Language series allows the teacher to adjust it to fit the full range of student developmental needs and learning styles. The unique combination of hardware and software addresses students' learning styles by providing activities for the auditory learner, the visual learner, and the kinesthetic/tactile learner. The variety of software allows the remedial student, the gifted student, and the average student, all, to benefit from the series.

A variety of peripherals are used to address the differing learning styles of young children. For those children who learn best through the tactile and visual modes the Muppet Learning Keys and the Touch Window provide the needed stimuli. If a student is primarily an auditory learner, the Echo Speech Synthesizer will provide for his needs. Frequently, in early childhood education, the teacher is faced with the dilemma of having to present the same skills in a variety of ways. These peripherals will help.

Curriculum is a unique entity. It will appear to be the same from one place to the next and yet be very different in its sequence or presentations based on the teacher. With the tools provided in Apple Learning Series: Early Language, the teacher may adapt the program to his/her specific curriculum or the district may decide to create a specific instructional sequence for itself based on the needs or philosophy that exist there.

The Curriculum Matrices in the Teacher's Manual will help to select just the right piece of software to focus on the skill the child needs. Additionally, the district or teacher may wish to use the Curriculum Matrices to help children increase skills which have shown as weaknesses on standardized test scores.

This usage of the computer is to its most realistic advantage: as a daily, vital part of the learning process. Using the Apple Learning Series: Early Language, the teacher now is able to integrate technology into the curriculum fully by blending computer activities into the natural flow of classroom instruction.

This is how the average person uses the computer on a daily basis. It only makes sense that students should be using the computer in the same way in their daily learning activities.

If you would like more information on the Apple Learning Series: Early Language series, you may contact one of the following people:

Jan Burton,
K-12 Education Sales Representative
12770 Merit Drive, Suite 1000
Dallas, Texas 75251
214/770-5800

Sandy Pratscher,
K-12 Education Sales Representative
6034 West Courtyard Drive, Suite 305
Austin, Texas 78730
512/338-2115

Bill Hanson,
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Houston, Texas 77092
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Barbara Baxley,
Education Training Registrar
12770 Merit Drive, Suite 1000
Dallas, Texas 75251
214/770-5800

THE IMPLEMENTATION OF A WRITING LABORATORY IN CY-FAIR ISD

Karen Smith
Cypress-Fairbanks ISD

Cypress-Fairbanks ISD has instituted a writing laboratory in each high school with the goal of improving writing skills at the high school level. In addition, the writing laboratory is viewed as a mechanism for integrating the use of technology into the curriculum. During this first year of use, each student in Study Skills and English will use the writing laboratory.

Cypress-Fairbanks ISD is dedicated to the use of technology in the classroom. The writing laboratory is a natural outgrowth of a continuing effort to provide students with exposure to appropriate technological tools. Students use a word processor with a spelling check, thesaurus, and style analysis. With these tools students can overcome the obstacles that may otherwise thwart their creativity. The poor speller checks his spelling. The student with a poor vocabulary accesses the thesaurus. The student who makes frequent grammatical errors uses the style analysis capability. Moreover, the accomplished writer revises papers with ease.

Within the first year of operation each Study Skills student and each English student will have the opportunity to use the system. This ambitious goal has created a need for extensive training of teachers within those curricula. Inservice training and after school use of the facilities have increased teachers' knowledge and confidence. An aide in each writing laboratory has also been invaluable in relieving teacher concern about problems that might arise.

The response to the use of the writing laboratory has been positive from both teachers and students. Requests for after school use by students have been high and teachers are requesting a second opportunity to bring their classes to the laboratory. During this first year of implementation many "traditional" teachers have utilized technology to enhance their instruction while exposing their students to tools that they will surely use in the future. (A demonstration of the software will be given as part of the presentation.)

The Magic of Computer Assisted Composition

Kay Bowerman
Director of Computer Instruction
Amarillo Independent School District
1616 S. Kentucky, Building C
Amarillo, Texas 79102

806-354-4200

Jan Burton
Education Representative
Apple Computer, Inc.
12770 Merit, Suite 1000
Dallas, Texas 75251

214-770-5800

This presentation will discuss the planning and implementation of Macintosh writing labs in the Amarillo ISD high schools. This will include discussions of the evaluation of hardware and software, teacher training, and implementation in the schools. They will discuss the success of these writing labs in the English curriculum and discuss future plans for further usage and expansion of the program. Hardware and software options will be reviewed with current updates on availability.

COMPUTER ASSISTED COMPOSITION

by Kay Bowerman and Mary Ruthe Carter
Amarillo Independent School District

It is only 7:30 a.m. and a group of students already are gathered in the hall outside the English lab. Each carries a small square of hard plastic, a computer disk. When the teacher arrives, they crowd around her, eager to take a place before one of the computer screens.

In the spring of 1986, the Amarillo Independent School District piloted a program to improve composition skills at one high school. In the fall of 1986, the program was expanded to all four high schools. Each English department has a computer lab dedicated to composition instruction. Each lab is equipped with fifteen Macintoshes, chosen for their ease of operation and versatility, networked with three printers. Honors classes have first claim on lab time, but others may use them as scheduling permits. (Separate CAI -- Computer Assisted Instruction --labs are available on each compus.)

Staff development sessions provided by consultants from Apple gave teachers an opportunity for hands-on learning about the computer itself. A composition consultant also gave teachers hands-on experience in research-based activities for classroom instruction.

For several years composition instruction has been a high priority in the Amarillo schools and improvement has been noted. Why then introduce technology into such a personal, creative act? Teachers found students reluctant to revise: changing a sentence, adding details, reversing the order, trying a different approach meant redoing an entire paper. The computer eliminates that need, gives students freedom to move, delete, insert in seconds and even to return to the original if that seems best. An added feature is the ability to illustrate compositions with the creative use of available software and to emphasize portions of text through changing font sizes and styles with the touch of a mouse.

In addition the hard copy with its professional look gives a pride of authorship. Students once hesitant to let someone else read their compositions now share them willingly. Voluntary peer evaluation and suggestion are a constant in the composing process. Student enthusiasm is an obvious indication of the program's success. Not only do students wait for the lab to open before school, they come in during homeroom and after school to work on papers for other classes as well as for English. Last spring's seniors came back during vacations to say how glad they were to have found a "friend" at college - a Macintosh.

As for effectiveness, teachers feel that writing is improving, that students are engaging in deep revision as never before. Certainly the papers are easier to grade for mechanics. Students are more concerned with accuracy when the product is hard copy; the error that could hide in handwriting stands out in print.

Their advice to other English teachers? Don't be afraid of computers but do become familiar with the one your students will be using. Take some time to do some composing of your own on the computer before taking the students to the lab. Make out a test, write a memo, experiment with the various formatting options.

> *It is 4:10 and three students are still in the lab. So are two teachers, one of whom was most reticent at the first. She has just finished printing a test for tomorrow. "Okay, kids," she say, "we want to go home sometime tonight--five minutes."*

UpDate on the Teaching of Writing in Electronic Learning Environments

Dr. Chester A. Fischer, Associate Professor of Education
Dr. Olga H. Fischer, Associate Professor of Education
The University of Texas at Tyler

This presentation will examine recent advances in the teaching of written composition which have become possible only as a result of computer technology. Computer-mediated, electronic learning environments of the sort that can be created using modern word/image processing software will be analyzed in relation to the teaching of written composition using a process approach. Innovative teaching of writing strategies will be presented with the aid of slides of exemplary writing related software, and the session will conclude with a series of recommendations regarding effective computer-mediated writing instruction.

The proliferation of microcomputers in society is profoundly changing the way human beings engage in written composition. Writing with computers is not simply a matter of exchanging pen and paper for keyboard and video monitor. "Video text" or "electronic text," as writing done in a computer-mediated learning environment might be called, represents a completely different medium from traditional text with its own unique and subtle characteristics. It should be the responsibility of the schools to prepare students for writing well in these new electronic learning environments, but if this is to happen teachers of writing must come to terms with the differing nature of effective writing instruction in these new environments. The following is a partial list of assumptions for consideration in a new age of writing pedagogy:

1. Word processing, page layout, and graphic design software is gradually becoming integrated into a new hybrid software genre--the text/image processor. Typical of this new software are capabilities such as state-of-the-art word processing, personal publishing, professional quality layout, advanced graphic design, outlining/idea organization, spelling checker and thesaurus, mechanics checker, etc. The new generation

of text/image processing software allows educators to create electronic learning environments that represent the most valuable resource yet devised for teaching written composition using a process approach. A microcomputer with such writing instruction software can directly and indirectly facilitate and enrich all stages of the composing process--prewriting, drafting, revision, proofreading, and publishing. It is worthy of note that it is "content-free" tools software and not CAI-oriented software that has the greatest potential to positively transform the teaching of writing.

2. Writing done on a computer is dynamic, fluid, malleable, transitory, interactive, and in a constant state of becoming. With but a few keystrokes text can be moved, deleted, copied, corrected, scrolled, restored, replaced, enlarged, and formatted at the writer's whim. Unlike traditional text which is an immutable artifact of a process undertaken in the past, text written at a computer exists in the "here and now" and is constantly subject to manipulation by the writer. In a sense, through its interactive nature, writing done in the new electronic learning environments gives the writer an implied sense of audience not present in traditional text. This ongoing feeling of audience is probably the characteristic of the new medium that is the most compelling for young writers.

3. Writing well electronically has become so integral to success in the real world that schools need to give writing instruction in electronic learning environments a place of major importance in their curricula. Thus far, most schools have incorrectly assumed that instruction in traditional writing is virtually the same as instruction in electronic writing. At the very least (a) keyboarding skills should receive as much attention as is being directed towards handwriting; (b) children, beginning in kindergarten, should have routine access to word/image processors for written and graphic composition; and (c) curricular emphasis through the grades should be less on the technical, "how to" aspects of the new software and more on the naturalistic use of the software through the entire process of composing.

It is quite possible that history will show that the communications capabilities of computers will more directly and profoundly affect society than the computational capabilities. This being the case, schools need to direct more of their resources--time, personnel, and money--toward computers as they mediate and transform all forms of human communication--especially written communication.

VIDEO DISK: A TOOL FOR SOCIAL STUDIES/LANGUAGE ARTS

Jack McDonald, Vice President
Regency Educational Systems, Inc.
4951 Airport Parkway, Suite 600
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This method of instructional enhancement will demonstrate how teachers can bring to life the events and people of the past for their students like never before. Additionally, students can use the tool to develop their own research and organization skills while making their own "video term paper".

WHAT RESEARCH TELLS US ABOUT THE USE OF WORD PROCESSING IN WRITING INSTRUCTION

Presented by Drs. Kathy Fite and Catherine Coulter
Department of Curriculum and Instruction
Southwest Texas State University, San Marcos, Texas

ABSTRACT: This presentation summarizes the results of recent research on the use of word processing in writing instruction. The summary includes studies on all levels (K-college). Approaches, techniques, and practices that have been found to be notably successful will be discussed as well.

Computer word processing is an application which can be a valuable tool for student writers. Selected research studies on word processing and writing instruction provide educators with the following answers to their questions. (Due to the limited space in the proceedings, the bibliography will be distributed during the session.)

1. How well do students need to know typing and word processing programs to be successful word processing writers?

*With only limited practice, students can learn basic word processing skills quickly; the necessity of learning a word processing program most likely will not inhibit the quantity of writing produced (Kurth, 1986).

*Junior high school students need more than an hour a week for six months to become as skilled in using a word processor as they are with using a pen (Daiute, 1986).

*Students with keyboarding skills do not necessarily make a significantly greater number of revisions to their compositions than those students without keyboarding skills (Gerlach, 1987).

*Students who learned keyboarding can continue to improve their typing skills in terms of speed and accuracy if they have continued practice (Wetzel, 1985).

*If consistent reinforcement of keyboarding instruction is discontinued, related skills decline (Warwood, Hartman, Hauwiller, and Taylor, 1985).

*Using a word processor, the student may take longer to write the paper than if it is written by hand (Loud, 1982).

*Fourth grade students may progress more rapidly in obtaining keyboarding skills if the keyboards are covered with paper (Warwood, Hartman, Hauwiller, and Taylor,1985).

*Keyboarding skills can be taught effectively to elementary students, but continued practice is necessary to maintain those skills (Warwood, Hartman, Hauwiller, and Taylor, 1985).

2. **Will student writers who use word processing revise more and write better papers?**

*Student use of word processing does NOT automatically increase the quantity and quality of student compositions (Kurth, 1986).

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*The length of composition is not always increased when upper elementary-aged students use a word processor for writing (Miller, 1984).
*Making word processing available to students will not automatically improve their writing or revision skills (Balajthy, McKeveny, and Lacitignola, 1986).
*Beginning writers do limited spontaneous revising of their own texts (Daiute, 1985).
*Using word processing programs for writing and revision will influence the quality of student composition (Balajthy, McKeveny, and Lacitignola, 1986).
*Students do not automatically perform in-depth experimentation in using word processors for revisions (Hansen & Wilcox, 1984).
*Children who use word processors write more and make more revisions although they may limit their writing changes to superficial, mechanical alterations, unless shown how to perform more sophisticated revisions (Balajthy, McKeveny, and Lacitignola, 1986).
*The limited amount of text displayed on a monitor at one time may deter some students from completing more large-scale organization changes (Harris, 1985).
*Word processors prove helpful when students are performing higher level revisions and reorganizations (Woodruff, Lindsay, Bryson, and Joram, 1986).
*When asked to expand their stories using word processing, younger writers inserted new entries at the beginning and/or or end of stories or at the paragraph boundaries; older students embelished their writing throughout their stories (Wolf, 1985).
*The potential for global editing is useless to students unless they are first taught to think and respond in terms of large-scale changes and the effects those changes can have throughout the paper (Wolf, 1985).

3. What instructional method does the teacher use for word processing writers?

*Word processing must be used to supplement writing instruction and not replace it (Balajthy, McKeveny, and Lacitignola, 1986).
*In a composition program, it is important that the teacher is knowledgeable about the composing process (Kurth, 1986).
*Teachers should model the revision process and monitor student revisions (Balajthy, McKeveny, and Lacitignola, 1986).
*Teachers should work with pupils during their writing rather than after the paper is completed (Graves, 1976)
*In composing a first draft of a paper, generally students prefer the use of paper and pencil; they prefer word processing for revision only (Woodruff, Lindsay, Bryson, and Joram, 1986).
*Computers should not be use to replace feedback on writing (Balajthy, McKeveny, and Lacitignola, 1986).
*Teachers who are not interested in teaching writing with the aid of computer applications should not be forced to do so; teacher attitude may influence student peformance (Cohen, 1987).

ACSL CONTESTS
FOR ADVANCED JUNIOR AND SENIOR HIGH STUDENTS

Dr. Tom Allen, Science Coordinator & Computer Teacher, Alamo Heights Junior School, 7607 N. New Braunfels, S. A., Tx 78209 (512) 826-0285

Dr. Pat Semmes, TCEA Contest Coordinator and Board Member, 121 Paseo Encinal, S. A., Tx 78212 (512) 826-1960

ABSTRACT

The American Computer Science League (ACSL) provides national competition in computer science at three levels of difficulty at the secondary level. Study materials, sample problems with solutions, and questions for four contests are mailed to participating schools. Teams of five students from the schools with the highest cummulative scores are invited to attend the All-Star Contest which is held in the Northeast over Memorial Day week-end.

The American Computer Science League (ACSL) was formed to promote computer science education at the secondary level. It was founded by students at Brown University with assistance from professors and local secondary educators.

Each year ACSL conducts four contests in each of three divisions which are held locally at participating schools. The three divisions are:

1. Senior Division - for the most advanced students such as those taking AP courses,
2. Intermediate Division - for students who have had experience in computer science but are not at the senior level, and
3. Junior Division - students must be at the 9th grade or below to participate at this level. (Even though the brochure says this is for "beginning" students, it is not appropriate for computer literacy students, and we found it extrememly challenging for students in their first programming course beyond computer literacy.)

Within a division, each contest focuses on a special topic. Two types of questions are included:

1. short theoretical and applied questions and
2. an interesting problem to be solved using a computer (students are allowed three days and a maximum of 45 minutes computer time).

When schools "join the league" (sign up for the competition), they receive complete study materials for the special topics which include information about the topic and sample problems with solutions. The special topics are often unfamiliar to the advisor and may provide a focal point for school curricula and extracurricular clubs.

After each local contest, the faculty advisor mails the five highest scores to ACSL. Schools with the highest cummulative scores are invited to send a team of five students to the All-Star Contest. Last year, this competition was held in Washington, D. C. over the Memorial Day week-end. The highest place teams in each division received Macintosh computers. Individual students with the highest cummulative scores in the competitions also received awards.

Participation in the contest is highly recommended for students who like to be challenged. The 1987-88 fee for any school to participate in any one division is $100. Each additional division is $50. For more information, write to American Computer Science League, P. O. Box 2417A, Providence, RI 02906 or phone (401) 863-3300.

ADD DIMENSION TO YOUR CLASSROOM---
USING "ENRICHMENT" ACTIVITIES
ON THE COMPUTER

Dr. Sandra Haven - Lamar University, Beaumont, TX. 77710

Mrs. Susan Preston - Graduate Student - Lamar University

This presentation will:

1. Show participants how computer enrichment activities can add dimension to their classroom structure.
2. Give teachers ideas on how to provide students with enriching type experiences on the computer.
3. Demonstrate programs (at different grade levels and subjects) that help provide enrichment.

The use of educational computing applications to facilitate learning within the adopted curriculum and provide for extension of instructional input should constitute the current major thrust of most if not all school districts. Application computer programs can enhance the learning process and supplement instruction (i.e. provide enrichment) at all levels of learning. This presentation will give teachers ideas on how computer programs can be used to provide viable teaching and learning alternatives for both teachers and pupils in the classroom.

Enrichment can be added in every area of the teaching curriculum. In areas of poetry, world geography, or United States history, simulations involving historical events or buying and selling a commodity can be used by the student to expand his knowledge and thinking skills. Mathematical skills can be reinforced or expanded through plotting graphs on basic to advanced levels or with the use of metric blackjack games. There are also games that let the student practice making change for purchases. From dinosaurs or Newberry award books to detective mysteries, the possibilities for enrichment are wonderfully infinite.

Many computer activities help students use and become familiar with an atlas, thesaurus, alamanac, a world globe, maps and encyclopedias for references. Even teacher management tools such as the word processor becomes a good tool for enrichment when it offers students spelling checkers, punctuation checkers, and even the ability to find grammatical errors.

Simulation programs also provide opportunities for students in experimentation where facilities or environmental conditions may not allow a real-life experience in this area. Students can control the actions of independent variables and, at the same time, observe the reaction of dependent variables. Computer interface software and equipment provide access to accurate scientific measuring devices; it may become an oscilloscope, a timer, a calculator, a thermometer, or a variety of other devices. The students receive the benifit of increased accuracy in measurement, a source of frustration in most investigations.

Games provide the student with an exercise in logical thinking and problem solving. They include activities involving competition, rules, tests, and goals. This type of program requires the student to know specific facts, perform certain skills, or demonstrate mastery of certain concepts in order to "win". Games increase the levels of motivation and certainly allow for enrichment opportunities.

The computer can be used extensively to provide and also to supplement instruction on the elementary, middle school and high school level. A microcomputer can also provide reinforcement and immediate feedback for tasks performed. The typical learning environment does not lend itself to consistency of feedback because there are numerous activities in that environment, and the attention of the teacher frequently is demanded elsewhere. Microcomputers can assist in delivering reinforcements and feedback with utmost consistency and teacher controlled frequency. With the aid of a computer, the teacher can truly implement behavioral principles to promote skill development, and can follow up by fading the reinforcment to promote skill autonomy and generalization. Immediacy of feedback can serve to motivate the student by providing feedback relevant to the current situation rather than feedback that has been delayed and possibly is no longer pertinent. Additionally, the instructional program can be designed to prevent reinforcement of incorrect responses. The microcomputer provides the chance to act on information and learn from it in a more efficacious manner.

Teachers of elementary and secondary students must be willing to work to prepare materials if they use the microcomputer as a source of enrichment in subject areas. Though students will eagerly use them, a certain amount of instructional freedom must be provided for in these situations. It is suggested that if there is not a full laboratory of computers available, then a "round-robin" type lesson assignment may be used with students working in small groups on various activities stationed around the room--one of which includes a computer activity. Students periodically move from one station to another until all activities have been completed. In computer activities, it is recommended that two students work together, as they tend to reinforce each other's comprehension. Allow students to plan computer activities for each other. It encourages creativity and provides another emphasis on the higher learning skills in Bloom's taxonomy theory.

Creativity, problem solving and critical thinking skills have many outlets when you add dimension to your classroom through the use of computer enrichment activities.

ADVANCED ACTIVITIES FOR MIDDLE SCHOOL GIFTED AND TALENTED STUDENTS

Dr. Sandra Haven - Lamar University, Beaumont, TX. 77710
Harry Charles - Pt. Neches Middle School, Pt. Neches, TX. 77651
Claire Charles - 404 S. 2nd. St., Nederland, TX. 77627

This presentation will give the teacher ideas on how to use the computer with gifted and talented students who are already computer literate and are ready to use the computer as a tool for learning.

What happens to a middle school student after he has become "computer literate"? Does the school just offer him one course at the sixth or seventh grade level where he learns about such topics as the history of computers, parts of the computer, computer terminology, and perhaps the BASIC language and then he is not encouraged to use the computer again until he gets into high school and takes a computer math course or a course in PASCAL? Let's hope this is not happening in the middle school, but it does appear to be!

In working with gifted and talented students, it is apparent that this type of learner loves to learn about computers and also is capable of using the computer as a tool for learning concepts in many subject areas. The teacher of this type of learner is missing out on many opportunities if he does not use the computer in the subject he teaches. This presentation will give the teacher ideas on advanced activities on the computer that can be use with the middle school gifted and talented students.

Following are a few of the ideas that will be discussed. One of the most pressing problems involved in using computers with advanced students is that by the third year there is a wide divergence of the students' capabilities. In addition to this, if the students participate in the Gifted/Talented program in a pull-out program, the contact time becomes an even more critical factor. On the other hand, if the students are scheduled into the program in a content course, there becomes an additional problem of covering the material in a different style and time element than is usually used for the advanced students in the "regular" classes. For example, in Port Neches Middle School, the Gifted and Talented students are scheduled into a special social studies class. This includes world geography/history in the sixth, Texas history in the seventh, and American history in the eight grade. The students are expected to do work that extends both the depth and scope that is presented in the other social studies classes. The students are expected to cover this work in less time with less review and reinforcement than usual. The bulk of the time saved is devoted to work with computers. The students do their social studies projects on the computer. The projects include data bases - in the past several years the classes have created data bases on European countries, the middle eastern countries, the states in the U.S., and the presidents. Aside from these endeavors, the GT students can conduct statistical surveys and write computer programs to analyze the data collected. For example, an appropriate telephone survey could be one on the 1988 presidential election. The students could analyze the results with the computer program or by using a spread sheet.

In addition to the above, all the students have done word processing. In the Texas history unit on the revolution, the students wrote papers on one of the heroes which they entered on the computer in a program that allows the user to adjust the speed. These in effect become a speed reading exercise. They also wrote a quiz on this era. The regular Texas history classes worked on this quiz program and the GT students acted as helpers and monitors. The American history class has written a similar program that has short biographies of women in American politics.

The G/T student who has been introduced to the BASIC language in the computer literacy class can also use the third year in middle school to learn advanced topics in BASIC. Naturally, not all the students do all of the following. By the third year all the students have worked on programming through read-data and subroutines. The third year the programming segments of the curriculum can touch on one-dimentional arrays and some of the pupils can handle two- and even three- dimentional arrays. Studies of computer memory and disk layout (software for this is Beagle Bros. products such as BYTE ZAP), text files, string manipulations, advanced preparation for screen layout and formatting, more work with ASCII and CHR$, library commands, and more extended work with PEEKS and POKES. They can write simulations and they can go much more deeply into graphics. Each student in the sixth grade does lo-res graphics and some do another one with animation. The next step has each student doing a hi-res graphic, and some get rather complicated depending on the student's imagination, initiative, and skill level. The students can also learn to add sound to their program. Another activity for the advanced students is to type in, run, and debug magazine programs from INCIDER, NIBBLE, and other sources.

Some utilities a teacher could use with this type of student depending on time and assignments are CROSSWORD MAGIC, the PRINT SHOP series, CERTIFICATE MAKER, MASK PARADE, FONTWORKS, and NEWSROOM. With the latter, "current" newspapers from most eras from ancient Egypt to the American Civil War could be written.

In addition to the above, a teacher could work on thinking skills with such programs as PROBLEM-SOLVING STRATEGIES, MICROZINE from Scholastic, UPTIME from Viking Technologies, and other software such as CREATIVE READING by Borg Warner.

There is not enough time to do the content work and all the computer activities so in the final analysis it boils down to this: what priorities do we set for the student and what priorities do they set for themselves?

"Challenge" Students with Logowriter Projects

Virginia Schreiner Neville
West Memorial Elementary
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This presentation explores the use of Logowriter with elementary gifted and talented students. Emphasis is given to showing Logowriter features which can be used to develop and create graphic scenes. Demonstrations include showing how to animate objects within a picture and how to write procedures to play simple songs. Projects created by fourth and fifth grade students of graphic scenes are shown.

Logowriter provides children with all the features generally associated with Logo as well as easier ways to create graphic scenes or pictures with animation and/or sound. There is the possibility of utilizing up to four turtles and thirty built-in turtle shapes. In addition, students have the option to create their own shapes to be used in their graphic scenes. Logowriter also includes a word processor, which means it has the ability to integrate writing and graphics easily. This presentation focuses on generating simple graphic scenes with shapes, animation, and sound.

In the process of designing a graphics project, children develop problem-solving skills. Because students generate the ideas for their scenes, they are motivated to learn necessary skills and are committed to finding solutions when difficulties arise. These individual projects allow students to work at their own pace and in their own style. Time is also available for students to experiment and explore the various possibilities different commands offer. When students show and share the results of their projects with each other, they see how different strategies can be used in creating animations and debugging errors. Logowriter lends itself particularly well to students' expressions of creativity and lets them attain varying levels of complexity in their work.

In creating a graphics picture, students can have the turtle draw, or they can design procedures to have the turtle draw. They can choose built-in shapes from the shapes page, adding them to their scenes by "stamping" them. If none of the built-in shapes meet their needs, the students can create and store new shapes on the shapes page that they can use later in their backgrounds. Students can change one or all of the turtles to an already-made shape or a shape of their own creation and then move that shape in their scenes. Once the initial commands to make the shapes move are learned, the students can have as many as four turtles changed into shapes moving all at once or one at a time. The commands for animation are saved as procedures. One of Logowriter's advantages is that once students have made the backgrounds for their animations, they can save their graphics without putting them into a procedure.

When the students incorporate sound with their graphics, they first define the notes by letter names and then write a simple procedure for each note. A superprocedure is created for a song. In addition, text can be displayed in the same scene as graphics so words can be added to music.

Logowriter provides opportunities that challenge students to create, solve problems, and explore. Children learn it with ease. The improved features make Logowriter very exciting for children as they apply the techniques and skills they have learned toward designing their own projects.

LOGICALLY SEEKING

Cassandra Harman Johnson
Millsap Elementary
Cypress-Fairbanks Independent School District
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Cypress, Texas 77429

During the past decade we have come to learn a great deal about giftedness. Simultaneously, we have witnessed a phenomenon in which out gifted students find that computers are an inexhaustible source of of both intellectual challenge and personal pleasure. Research has shown us that there are reasons for this natural affinity between a gifted child and his computer.

Gifted people typically have an unusual capacity for processing information and will exhaustively examine their own ideas and the ideas of others. They tend to have flexible thinking styles and see unusual and diverse relationships. Because of this, they need to be taught to use their problem solving skills and encouraged to use their abilities to generate original ideas and solutions by solving problems in diverse ways.

Keeping these characteristics in mind, if you choose your software carefully, you will also witness the manifestation of persistent, goal directed behavior, and your gifted students will find it difficult to abandon their screens for other academic pursuits.

The reason for pursuing logic at the elementary level is to help students learn to organize their ideas and understand what they learn. In the early years, logic can best be approached through the exploration and manipulation of objects, categorizing, classifying and finding similarities and differences. While much of logical thinking and deductive reasoning is a matter of common sense, there are many quality programs available that can help hone these thought processes.

Some of the programs successfully implemented and recommended by teachers at the elementary level in the Cypress-Fairbanks School District include:

Gertrude's Secrets, Gertrude's Puzzles, Rocky's Boots by The Learning Company; Monkey Business, Scrambled Eggs, Speedy Delivery and Pipeline by LTI; and Pipeline by Sunburst.

LOGO HAIKU

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Since language/literary arts as approached by computers should involve more than drill and practice, methods to enhance verbal skills need more attention. In this demonstration, there is a presentation of a sequence of 4 Logo-based haiku generating programs. Each is a bit more sophisticated than the preceding. In the classroom, after some basic instruction in editing Logo and a class period on 7 of the basic features of the classical Japanese haiku, the students refine the rules in stages to produce mechanically perfect haiku (problem-solving learning) and then add alliteration, assonance, word and season associations, and so on (verbal/literary learning). This demonstration shows the 4 programs and suggests challenging extensions of the project.

Nancy Williams
SIMULATIONS: On and Off the Computer
La Porte I.S.D. -- Baker Junior High School
La Porte, Texas 77571

A creative curriculum for gifted middle-schoolers has been designed using simulations/games both on and off the computer. A variety of topics using computer instruction and non-computer role-play will be presented.

SIMULATIONS: On and Off the Computer is a session which will focus on how to successfully utilize simulations with gifted students at the middle school level. Characteristics of successful simulations will be discussed. Particular emphasis will be placed on the development of units which employ computer and non-computer simulations and role-play. Sample curriculum topics to be shared are leadership training, detectives, inventions, archaeology, and future studies. Utilizing computers for the development of school and/or social studies newspapers will be demonstrated. Specific software and titles of non-computer simulations will be given in handouts which demonstrate the integration of goals for gifted students into specific interest areas. Those who are looking for motivational ideas for middle-schoolers should attend this session for a multitude of hands-on ideas.

The presenter has been involved with the DIMENSIONS Program for Academically Gifted in LaPorte, Texas, for twelve years. Computers have been used in the middle school gifted program for the past five.

SO THEY'RE COMPUTER LITERATE – WHAT DO WE DO WITH THEM NOW?

JUDYTHE HIXSON
Computer Literacy Teacher
Campbell Junior High School
Cypress-Fairbanks Independent School District
Houston, Texas

ABSTRACT: In Fall 1987 Cypress-Fairbanks Independent School District implemented a junior high semester course entitled Computer Literacy II. This course was made available to all students who had successfully completed Computer Literacy I. This presentation will focus upon one of the projects used in that course. The presentation will include a complete daily lesson outline for the project, descriptions of software products used, management tips, and examples of students projects.

The scope of our Computer Literacy II course outline centered upon using computers to write and improve research skills. With that goal in mind I developed a unit that employed desktop publishing to produce a booklet on dinosaurs. Often students are required to produce research papers in other content areas. It was my aim to use this unit to show the student how his ability to use the computer could expedite and enhance such projects. Students used a database, a word processor, and several graphics programs to assemble an original booklet on dinosaurs.

Because these students were "computer literate" I was able to concentrate upon their creativity. It was not necessary to teach the tool, therefore the student could engage in creative intellectual activity utilizing the tool. The original idea came when I taught an enrichment class for fifth graders in summer school. Examples of both finished products will be available.

The end product was a booklet but through each lesson additional skills were taught. When developing the class dinosaur file using Bank Street Filer, students were instructed in formulating a database file so that the information is relevant. They wrote original questions with which to search the class dinosaur file.

In using the Bank Street Writer to create original jokes, aspects of humor and characteristics of appropriate humor were discussed. When writing the folktales, students discussed the qualities of the dinosaur that lent themselves to weaving a folktale. Using the word processing functions, the students were able to proofread each other's work and easily edit and revise their documents before producing final copies. As a direct result of this experience, many of my students ask to come in and use the word processor for Language Arts, History, and Science papers. They had learned the power of the word processor. In addition to word processing, we used Poetry Express, a software program that instructions in various poetic forms and allows the students to create original poetry.

As students used various graphics programs to enrich their publications, they were able to experience several different programs and compare and contrast the value of each. Some used original computer artwork to enhance their booklets.

The unit proved to be quite a learning experience for the students and the teacher, but then isn't that always the case? It was a pleasure to be able to use the computer and not wisk the students through all tool applications as we must with the time limitations of Computer Literacy I. I'm sure you will find the students work interesting to peruse and the workshop presentation valuable if you need a challenging and fun project for students who are computer literate.

Computers in High Power Archaeology

Albert Ortiz, Project Archaeologist and third grade teacher
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Sunland Park, New Mexico 88063

Abstract

The opportunity to conduct both an archaeological survey and excavation located at Sunland Park Elementary School across the Rio Grande from El Paso, Texas in New Mexico is welcomed. This project is allowing students to participate in the methods of identification and assessment of archaeological properties on a site which dates about 1100 A.D. with the assistance of the computer. The presentation will focus, among other related topics, on the performance of software assisting students to perform high power archaeology; A) Logo to assist the students in performing horizontal and vertical angle setting out and measurement; and B) Use of application software (RapidFile and ChartMaster) by crew members and project archaeologist for quantitative analysis and interpretation of recovered material.

Introduction

During the past field seasons, students have used conventional methods on the site to extract, and interpret data. This field season will mark a dramatic advance over earlier work interms of the superior quality due to; a) The practical skills and theoretical perspective of the Project Archaeologist Albert Ortiz; b) Employment of software in quantitative work to address those methods and objectives of archaeological methodologies so that these students will gain a greater understanding on the nature of archaeological resources; c) Ability of well train crew (4th graders) who have been carefully nursed on IBM PC, PC jrs, and Apple IIes since first grade using traditional methods and now being weaned on a PS II/30 in nontraditional methods; and d) The use of a computer with a hard disk drive. Those past and present crew members have braved Mother Nature's worst elements, sometimes grumbling, but always ready and willing to stand and follow their dauntless leader who on occassions questioned his own judgements in doing it in the first place. Muchas Gracias - Market Place Kids.

The majority of present crew members are students who started out in the Spanish curriculum and used the computers as part of the transfer package curriculum to learn English. For three years, these students spent an average of nine hours a week on three types of computers in the traditional methods of computerized instruction, coupled with extra social studies, science, and math. Special emphasis was also placed in remote sensing (aerial photography and topographic maps), cartography, and drafting.

From nontraditional methods of computerize instructions, students are acquiring recognition of new computerized strategies being used on this project;

a) Logo played a significant role showing students the art and science of plotting points on the earth. Students had been accustomed to Logo since first grade. At third grade, students were introduced to Continnental Press product Logo: Explore & Discover in which they used a clear plastic angle finder with a moveable needle. On learning the bases of a moveable needle, the participants were introduced to using a Silva Compass for horizontal measurements. This instrument served as a sighting compass to take magnetic and true bearing points. One of their survey project was to take a drawing of a soccer field and plot it on the the playing field. Verticle angles were taught using a crude homemade clinometer consisting of two pieces of wood and a plastic protractor. Brunton Compass combining all these features was then used as an instructional aid. This culminated with the use of a transit. The transit with the aid of a scope was used to lay out a grid on the site and to find out the elevation of the site. Knowledge of plotting angles, bearings, and azimuths require a significant amount of higher level of math. However, Logo provided sufficient knowledge for locating points and orientation of lines based upon measurement of angles and directions using both direct and indirect method for gathering and processing information about the physical environment within the archaeological site;

b) Creating an archaeological database using RapidFile and ChartMaster to decide what data enables them to conclude, or do not permit them to conclude about the archaeological resource of the area. Current analysis of databases indicate a variety of subsistence-related activities and the exploitation of the local environment and;

c) Initiate C.S.S. Designer CAD software to do some of the drafting associated with maps and cultural material.

Outside of the field of computerize application, both past and present crews were taught to identify cultural material found on such an archaeological site to include different types of ceramics, lithic material, bones, flora, fuana, and lithology. All material recovered were carefully bagged and tagged for analysis in the lab.

It is hoped that having grown up with computers since first grade, these students will recognize the importance of computers, math, and science in their daily activities. So as to: 1) motivate them to choose science and engineering as careers; 2) develop pride in the contributions of their culture to science; and 3) examine the cultural biases in science.

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ENHANCE LEARNING WITH APPLE LOGO

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You can establish a creative, problem solving environment for students by introducing the Logo programming language into your daily curriculum, incorporating it in an after school computer club or summer computer camp. This workshop offers hands-on activities for introducing the fundamentals of Logo and provides a flexible sequence of activities for introducing primitives. It covers writing, editing, and saving procedures. It also addresses super and subprocedures, variables, tail-end recursion, and list processing. The handout is written to help the novice get started with Logo, but includes activities and suggestions that will appeal to the intermediate user.

Participants should bring a blank diskette if they would like to have a copy of the files used in the workshop.

Many descriptions have been used to describe the Logo language. My favorite description is: "Logo is a room...no threshold, no ceiling...By this statement, people mean that Logo as a language requires no special background to enter, but having entered in this Logo room, house, or building, learners find no predetermined limits in the language. This infinite Logo space offers unlimited possibilities which we can explore. Perhaps, the space is a room without boundaries, learning without limits, a school without walls." (Tipps 4)

Logo is a powerful, unstructured programming language that can be used to make the computer a tool to think with. The turtle, a small triangle, becomes the vehicle used to interact with the computer by communicating in the Logo language. It is an excellent tool for creating a stimulating learning/discovery environment for students to develop problem solving skills. Logo is extremely flexible and adaptable to individual and classroom needs; easily incorporated within a classroom setting or providing an exciting foundation for an after school computer club.

Needs of individual students are met, despite the simplicity or complexity of their projects. Students with simple projects are just as proud, happy, and excited with their accomplishments as students with more complicated projects. They are not the least bit intimidated by the fact that another project might be more complex.

Students should be allowed to work at their own pace and own level given access to new primitives and concepts as they are needed. A Logo environment establishes sharing and congenial peer relationships. All students have an opportunity to teach their peers something unique that they have discovered and to learn the same from their friends. Logo encourages partnerships and lends itself well to heterogeneous groupings. It is not always the gifted and talented students that "shine" in a Logo environment. One thing that a Logo environment does convey to all students is that they are in control of the computer.

Logo enhances the development of basic skills, while developing problem solving/thinking skills. Students develop spatial relationships, directionality, sequential, categorization, organizational, estimating, probability, measurement and communication skills. They soon learn that the computer did not make a mistake. The turtle did exactly as it was told. They learn that precise, exact communication is a necessity. Students discover how to break learning down into small manageable parts and to put those parts together in an organized sequential manner.

Students start by learning "primitives," basic Logo commands that direct the turtle around the screen. From there, they can build their own language by using the primitives to write new commands called procedures. There is not a set sequence or time frame for the introduction of primitives. Individual teachers will soon find the sequence/time frame that works best for them and their individual student groups and will probably find it changes from group to group and year to year.

Do not feel that you have to know Logo before you can introduce it or teach it. Logo is an on-going learning environment for teachers and students. You will learn from your students just as they learn from you. Students are not as concerned with altering or changing "set" ideas as you are. It does not hurt to say, "I do not know. We will work on it and see what we can find out." Students enjoy teaching their teachers what they have discovered.

There are many excellent references that will guide you in developing and structuring your own unique Logo environment. Get one and start an exciting, fun filled learning experience right with your students. The rewards are tremendous.

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Enhancing the Content Areas of the Curriculum Using Logo Writer

Georgann Pierce
Art Pierce
Judy Till

Plano ISD, Plano, Texas

The Logo program has been typically used in math application for instruction. Now, LOGO WRITER incorporates word processing, graphics, animation, color, sound, and LOGO into a total package giving the teacher opportunities to broaden its use into every area of study. Students and teachers can now go to the computer to create and discover while learning. LOGO WRITER paves the way for the partnership between kids and computers to be interactive rather than passive.

Seymour Papert has said, "In my vision, the child programs the computer and, in doing so, both acquired a sense of mastery over a piece of the most modern and powerful technology and establishes an intimate contract with some of the deepest ideas from science, from mathematics and from the art of intellectual model building."

LOGO WRITER is a learning tool for students. It provides a creative learning environment in whcih students can formulate ideas, construct systems, and create images. The most important objective in using LOGO WRITER is to develop learning skills and to explore different areas of knowledge.

The presence of computers in schools has been well-established. Two of the most popular applications of the computer for instruction has been word processing and programming. LOGO WRITER combines these two activities. LOGO graphics provides a concrete and meaningful context for experimenting with geometric concepts while offering an easy entry into the world of programming. Word processing adds another dimesion to this learning context by allowing words and language to become more meaningful and accessible.

Through the combination of graphics and word processing, LOGO WRITER produces a change in the learning environment. Word processing enriches the graphics activities and vice versa. Text becomes an object that is interesting and can be easily manipulated and changed. Color, sound, and animation are available to further enhance the child's creations.

LOGO WRITER links classroom activities both on and off the computer. The computer becomes a tool that the child eagerly reaches for. Our presentation will offer practical, hands-on, "kid tested" activities to integrate this program into the content areas of the curriculum.

First Course in Teaching LOGO

Wanda Mattarocci, Connie Rasa
Hardin Jefferson ISD
Commputer Lab Directors, Elementary and Jr. High
Sour Lake, Texas

This presentation will introduce the participants to some of the primary LOGO commands with the use of a commercial program LEARNING THROUGH LOGO by Sunburst. An alternative method using mazes placed over the CRT screen will be displayed. The participants will define the attributes of a square and teach the turtle the procedure. The edit mode will be used to add a variable.

LOGO is a powerful language that enables students to work within a structured planning methods but it also allows unlimited creativity.

The documentation for Learning Through Logo provides activities and student worksheets. The game diskette has four games. These games use mazes and dot to dot pictures. The students learn the primaries FD, BK, RT, LT, CS. They learn the length of a turtle step. They learn to turn the turtle using degrees. Approximately 30 minutes practice on each game will help the students move the turtle.

I. Moving the turtle

II. A square

III. Teaching the turtle a procedure

IV. A design

V. Using a variable

VI. Edit mode

VII. Procedures within procedures

VIII. Saving

INTEGRATING MATH AND ENGLISH LANGUAGE ARTS WITH LOGOWRITER

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Participants attending this session will be introduced to the fascinating world of Logowriter! Emphasis will be placed on how the software can be used as the tool to integrate mathematics and English language arts objectives.

WHAT IS LOGOWRITER?

"In my vision, the child programs the computer and, in doing so, both acquires a sense of mastery over a piece of the most modern and powerful technology and establishes an intimate contact with some of the deepest ideas from science, from mathematics and from the art of intellectual model building."

Seymour Papert

Logowriter is a learning tool for students. It provides a creative learning environment in which students can formulate ideas, construct systems, and create images. The most important objective in using Logowriter is to develop learning skills and to explore different areas of knowledge.

HOW IS LOGOWRITER BEING USED IN FORT BEND I.S.D.?

As in most Texas school districts, Fort Bend I.S.D. continues to search for innovative instructional materials and methodologies that can improve basic skills instruction. It is believed that Logowriter is such an innovation, provided that its implementation is appropriately conducted.

The intention of implementing turtle graphics (one application of Logowriter) in Fort Bend I.S.D. is to assist the teacher in teaching mathematics skills, primarily geometry. Additionally, through the turtle graphics application, students automatically apply many study skills.

The text writing application of Logowriter will assist students in applying the writing process. It is the intention of Fort Bend I.S.D. to utilize Logowriter for pre-writing activities, including draft documents and producing final documents in English language arts classes. However, if accessibility to computers prohibits teachers and students from completing the entire writing process via the computer, computerized pre-writing activities should become the first priority over using the computer for only the final copy.

The following list identifies a variety of ways in which Logowriter would be a useful tool to teachers while teaching the mathematics and/or English language arts curriculum.

1. Study Skills: Following Directions, Identifying Alternatives for Solving Problems, Organizing, Communicating, Listening, Transferring, Distinguishing Cause and Effect
2. Geometry
3. Problem Solving
4. Basic Operations
5. Measurements
6. Estimation
7. Charts and Graphs
8. Number Patterns
9. Predictions
10. Spelling Lists
11. Pre-writing Activities
12. Proofreading
13. Re-writing
14. Parts of Speech
15. Paragraph Writing
16. Short Story Writing
17. Branching Story Writing
18. Interviews
19. Poetry Writing
20. Letter Writing
21. Book Reports
22. Outlines
23. Tables of Contents
24. Visual Representation
25. Keyboarding Skills

IN CLOSING...

The capability of integrating graphics and text writing applications together provides an avenue for integrating mathematics and English language arts curriculum. The enthusiasm of students being able to enhance their writing assignment with geometric shapes and figures becomes an exciting production in both the math and English language arts classrooms!

INTEGRATING PROBLEM SOLVING VIA LOGO INTO THE ELEMENTARY CURRICULUM

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Problem solving activities via LOGO can be integrated into all subject areas of elementary curriculum. The presentation will offer suggested activities for various subjects incorporating LOGO instruction into the total elementary enviornment.

Todays heavily crowded curriculum offers little time for variation of format yet, still holds the required necessity of teaching higher level thinking skills. One of the most innovative methods of doing such today can be accomplished by means of LOGO instruction with the computer. Contrary to opinion and experience, the possibilities when teaching LOGO are much more complex than just using turtle graphics or programming. LOGO instruction can be a most stimulating tool for creating and teaching problem solving skills in all subject areas.

Math is one subject area that becomes most evident for integrating with LOGO instruction. Be it measurement, inequalities, degrees of angles, geometric shapes or the like LOGO can be merged into the math area at any level to provide stimulating problems for students of varying academic abilities. In fact, such problem solving activities can be a new motivation to turn on even the low achiever to the wonder of math and offer successes not previously experienced. The possibilities for improving the elementaary math curriculum via LOGO instruction are endless, as well as exciting for the teacher.

However, math is not the only subject with open ended possibilities when LOGO instruction is integrated there in. The study of motion or reflection while complex, can take on new meaning for even the youngest student when presented via LOGO. A new visual creation of these concepts can be displayed before the student in a way that will arrouse curiosity and high level thinking most effectively. The process of experimentation can be made available to each student via computer that will help develop a more thorough understanding when visually created by each student. LOGO instruction offers yet another viable solution to the never ending problem of lack of equipment or lab areas in the science field.

While Science and Math hold endless possibilities for LOGO integration, applications of LOGO activities in the Fine Arts field are endless. Even the youngest child can be excited by his own creations of line, shape, or color with the challenge of creating a given picture via turtle graphics. The study of colors or patterns via LOGO can also offer a new dimension to art for the elementary student. The creativity and high level thinking skills stimulated through LOGO instruction can only enhance the daily elementary setting in a most productive way.

In conclusion, LOGO instruction, when integrated into all subject areas of the learning setting, will enrich the quality of the curriculum offered; as well as produce results that far surpass other methods of instruction. Math, Science, and Fine Arts are but a few of the areas that will be enhanced via the integration of LOGO instruction not to mention the improved problem solving skills which will be evidenced by student development.

Logo for Early Childhood:
It's EZ-er Than You Think

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Abstract

This paper outlines an approach used to introduce Logo to students in early childhood (K-2), through the use of EZ-Logo. In keeping with the stages of development for these students, the turtle was presented as a tool to use for drawing, with the students' role being to teach it what to draw. Exploration and discovery were emphasized. Conclusions from the students' work and use of EZ-Logo commands are in line with the model of learning advocated by Papert, and provide guidance for the introduction of traditional Logo.

Logo, the programming language developed by Papert (1980), continues to gain slow but steady acceptance as an integral part of computer education in the elementary school. The educational computing community seems to have reached the consensus that teaching elementary students to program in Logo is a high priority. At the same time, there is some hesitance on the part of teachers to introduce Logo, especially in the early grades. According to Thornburg (1987), "many . . . who have supported the use of Logo in education have been disappointed by the poor penetration of this language into the classroom." (p. 85)

Logo and its companion language for early childhood, EZ-Logo, are especially well-suited for use with young children, because they allow for experimentation and discovery, for intuitive as well as logical thinking. Papert (1980) accepts Piaget's view that children construct their own knowledge structures, that they learn much without being taught. Logo provides materials and experiences to make this kind of learning take place.

Papert's goal in designing Logo was to produce tools for children to think with -- the first and most important of these being the Logo turtle. The turtle serves as the "object-to-think-with" for children using Logo. The turtle can be made to "do" things, that is, to move around the computer screen in response to the commands the child types. Getting the turtle to move in this way is engaging enough to assure that the child will continue to explore with Logo. The idea of programming with Logo becomes, according to Papert, analogous to teaching the turtle a new word.

This is the approach we took with our class of second graders. All had some previous experience with the computer, but their descriptions of the programs they had used all fell into the "drill and practice" category. We introduced students to the idea of a computer program that they could teach to do things for them, such as drawing pictures and designs. The EZ-Logo program produced by the Minnesota Educational Computing Consortium (MECC) was the starting point for these second graders. Through the use of single letter commands, the turtle can be moved about the screen to produce graphics that, while not as precise as those possible through Logo, are engaging and recognizable.

In the following weeks, students explored the EZ-Logo commands, and used them to solve the mazes that are part of the EZ-Logo teacher's guide. From this activity they moved on to drawing simple shapes and pictures. Exploration and discovery were stressed. Typing was sometimes a problem, but we found that regular practice in this area helped a great deal.

Throughout their experiences, we noticed that the children worked intuitively rather than logically. They tried a line, or turn, and if it was not what they wanted, they simply erased the line or reversed the turn, and began again. We could see this by having EZ-Logo redraw the pictures which had been saved on a disk. In this mode, the turtle retraces all the steps entered by the student, even the ones that are later erased or reversed. In some students' drawings, entire pictures were drawn, erased and another picure begun. In others, one can note that they used a series of right turns, even when it would have been more efficient to use a single left turn.

Finding that students went through these processes while maintaining their motivation and without becoming discouraged lends support for the type of learning Papert (1980) intended:

> Many children are held back in their learning because they have a model of learning in which you "got it" or "got it wrong." But when you learn to program a computer you almost never get it right the first time. . . . The question to ask is not whether it is right or wrong, but whether it is fixable. (p. 23)

These students will later be introduced to traditional Logo. As Logo places greater demands on their logical and sequential thinking processes, our goal will be to help them maintain the intuitive model of learning that EZ-Logo encourages. In that way, they can continue to use the turtle as an "object-to-think-with" in a somewhat more structured way, asking not whether their work is right or wrong, but if it is fixable.

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Logo, Lists, and Language Arts

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Abstract

One of the advantages of Logo as a tool for educational computing is its ability to manipulate words and lists of words. With Logo, students can explore the nature of language and different forms of writing such as poetry and sentences. This can lead to new understanding of how English works. Participants will use Logo and language tools created with Logo to explore language ideas.

Logo, Lists, and Language Arts

Logo can be used to explore language and language arts. With Logo, students are able to create their own commands. Naming commands in an understandable fashion is a first lesson in understanding that language is a set of conventions which people use to communicate.

One special feature of Logo is its list processing capability. Most computer languages have computational abilities, but Logo can also manipulate words and lists of words. Many projects can be used which allow students to explore the structure of English (or other languages). A few of the commands which are used in list processing are **WORD, SENTENCE, FIRST, BUTFIRST, LAST,** and **BUTLAST**. These commands are fundamental to building language tools for creating sentences and poetry.

For example, a procedure might be created for a list of nouns. A separate procedure is used for verbs.

```
TO  NOUN                          TO  VERB
OUTPUT [ BOY, GIRL, DOG ]         OUTPUT  [ RUNS, EATS, JUMPS ]
END                               END
```

A simple sentence could be formed by calling up the FIRST NOUN and the FIRST VERB.

```
PRINT  SENTENCE  FIRST  NOUN  FIRST  VERB
BOY RUNS
```

Students recognize quickly that this sentence structure and list of verbs and nouns is severely restricted. Then Logo tools for more elaborate sentences and other lists of words can be introduced.

Poetry is an ideal way of exploring language with Logo. A simple two line rhyme might be a way to start.

I had a little ______
It lived in a ______

After playing with words in the blanks, students can make a list of possible words and a POEM procedure. The rhyme gets more interesting when a command such as PICK allows the blanks to be filled in with any word from the list.

```
TO RHYME.LIST.A
OUTPUT [ FROG  DOG  LOG  HOG  BOG  COG  FOG  JOG ]
END

TO PICK :LIST
OUTPUT  ITEM  (RANDOM 1 + COUNT  :LIST)  :LIST
END

TO POEM
PRINT  SENTENCE  [ I HAD A LITTLE ]  PICK  RHYME.LIST.A
PRINT  SENTENCE  [ IT LIVED IN A ]  PICK  RHYME.LIST.A
END
```

Now the poem not only comes put with sensible rhymes but can also create interesting, but nonsensical ones.

```
I HAD A LITTLE HOG           I HAD A LITTLE FOG
IT LIVED IN A BOG.           IT LIVED IN A DOG.
```

From this point, students can vary the poems in many ways. The structure can be adapted to different forms, and the rhyming lists can be changed.

Participants in this session will have the opportunity to use a variety of Logo procedures for exploring language. With only a few simple Logo tools such as these, students in 4-8 grades are able to create and explore many ideas in language.

LogoWriter's SurveyTools and GraphTools

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LogoWriter can take us far beyond the "problem-solving microworld" which is automatically associated with programming in Logo. With LogoWriter, children are still immersed in a problem-solving environment while creating and working on materials that relate directly to other academic areas. With SurveyTools and GraphTools, students can take surveys via computer then illustrate the results of the survey in the form of a bar, line or circle graph. This presentation will be a demonstration of public domain programs created during the University of Virginia's 1987 Logo Fellowship Program.

SurveyTools and GraphTools consists of four separate disks containing tool programs to be used with elementary and junior high students. The following is a brief discription of each disk:

1. Students can design, take and print surveys with the SurveyTool. An overview of the entire project is included on this disk and can be printed at the users convenience.
2. Students can design simple bar graphs or comparison bar graphs. The comparison bar graphs use a colored bar compared to a white bar.
3. Students can design simple line graphs or comparison line graphs. The comparison line graphs use a colored line compared to a white line.
4. Students can design pie graphs. By simply entering the number of items for each category, a pie graph will be drawn.

The three GraphTools disks each contain an instruction page that can be printed These instructions will lead the user through the three steps in using each disk. Students can do a tutorial first to see how to make each graph and what each number means. Next, a tool program is available for students to enter numbers as prompts are given. After the student has worked with this for awhile, he/she will be ready to use the tool

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procedure that require numbers as inputs to the procedure. These tool programs can be loaded into memory and used to draw graphs without being saved on the flip side of the page.

SurveyTools and GraphTools are versatile programs and easy to use. They can be used only with LogoWriter and on Apple machines. They are in the public domain and information about obtaining copies will be availiable during the presentation.

THE LOGO DYNATURTLE: A COMPUTER SIMULATION IN NEWTONIAN PHYSICS FOR ELEMENTARY AND SECONDARY EDUCATION

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ABSTRACT

The teaching and learning of physics can be difficult. Research has shown that part of the problem is that students tend to have firmly rooted misconceptions of the physical world. These misconceptions develop into personal theories of how the world operates which can interfere and contradict formal physics instruction. Computer simulations offer science educators with practical ways to let students experience many physics concepts first-hand. One such simulation, involving the LOGO dynaturtle, simulates a free-floating Newtonian particle in two-dimensional space. Students typically find the dynaturtle simulation highly motivating and instructive. The dynaturtle experiences can serve as a strong foundation for subsequent, traditional instruction.

There is a general agreement that Newtonian mechanics can be difficult to teach and to learn (Champagne, Klopfer, & Gunstone, 1982; Kolody, 1977). Learners of various age levels have many misconceptions about how the physical laws governing the motion of objects described by Newtonian mechanics operate (diSessa & White, 1982). For example, a general misconception is that things invariably move in the direction in which they are pushed. In reality, a push merely adds to the existing momentum of an object and usually only deflects it. These misconceptions are due, at least in part, to the fact that the forces of friction and gravity are so powerful that their effects on the motion of objects heavily outweigh the effects of other forces. For example, the force exerted on a baseball in the act of throwing is quickly diminished by gravity (the ball is pulled to the ground) and friction (the ball rolls along the ground). In a pure Newtonian environment, without the powerful forces of gravity and friction, the ball would travel in the direction thrown until some other force acted upon it. For most students, this is a difficult theoretical concept since their everyday experiences of moving objects involve the physical forces of friction and gravity.

These misconceptions are often firmly rooted in the minds of students because their experiences have led them to construct their own personal theories of how the world operates. These personal theories describe and explain plausible systems for scientific phenomena and usually vary significantly from explanations taught in typical physics lessons (Champagne, Klopfer, & Gunstone, 1982). These personal theories of scientific phenomena often produce interference and inhibition in the learning process. Formal instruction in physical concepts usually presents certain apparent contradictions. These contradictions result from the inconsistencies between the actual scientific account and each student's personal theory. Even though students may be able to memorize facts and concepts dealing with the laws of motion, they may be unable to apply this information outside of the rigid contexts in which they were presented (diSessa, 1982). Students tend to revert to their misconceptions when presented with novel problems to solve.

The instructional problem of forcing students to "unlearn" personal scientific theories in lieu of accurate ones has received much attention among educational and science researchers in the last few years (see, for example, Champagne, Klopfer, & Anderson, 1980; Champagne, Klopfer, & Gunstone, 1982; Chi, Feltovich, & Glaser, 1981; diSessa, 1982; diSessa & White, 1982; Kolody, 1977). Many useful discussions exist which describe the sequence of learning events that students must go through in order to successfully reformulate their personal theories of scientific phenomena. The solution to this instructional problem lies in giving students concrete experiences with physics concepts -- have students *experience* the concepts rather than study them. These experiences should serve to allow students to "discover" fundamental physics concepts for themselves and to permit informal hypothesis testing. The best environment for such experiences would be one where the forces of gravity and friction have been removed. Although it is impossible to provide learners with just such a learning environment (short of stowing away on the next space shuttle flight), computer simulations approximating these conditions exist.

One such simulation, resulting from work with LOGO, involves a dynamic turtle, or dynaturtle, which obeys Newton's laws of motion (diSessa & White, 1982). A dynaturtle remains at rest or travels at a uniform velocity in a straight line except when acted on by forces. In this microworld, students assume complete control of a Newtonian particle. Given sufficient time, students learn physics concepts in incidental ways through constant feedback from this microworld. The drawback of computer simulations is that they may not teach certain concepts directly or predictably. Therefore, the major purpose of the dynaturtle simulation is to give students a meaningful and accurate *experience* which subsequent formal instruction can build upon. In other words, "playing" with the dynaturtle can serve as an "anchoring" experience for further instruction.

Current research with the dynaturtle simulation, as well as associated themes, such as the role of computer animation, is underway at Texas A&M. Computer software, in the form of tutorials, games, and simulations, has been developed in this research process. For example, a series of dynaturtle games is available on disk for the Apple IIe microcomputer. Educators interested in receiving a copy of these dynaturtle games should write to the author at the aforementioned address.

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USING LOGOWRITER WITH K-2

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This presentation will be broken into three sections. In the first section, there will be a brief introduction and demonstration of LOGOWRITER, highlighting the advantages and differences of this Logo over other versions of Logo. The next section will cover different methods of teaching children the concepts of directionality, shapes, and movement using LOGOWRITER. The last section of the presentation will incorporate language arts skills using the word processing features of LOGOWRITER.

"In my vision, the_child_programs_the_computer and in doing so, both acquires a sense of mastery over a piece of the most modern and powerful technology and establishes an intimate contact with some of the deepest ideas from science, from mathmematics, and from the art of intellectual model building." Seymour Papert, MINDSTORMS, 1960

I. Introduction to LOGOWRITER
In the past Logo has been hailed as a wonderful tool for teaching children the beginnings of mathematical concepts. Now Logo can be used in the language arts field as well. Not only can children create pictures, they can write stories about them, too--all on the same screen.

- A. Editing features
  1. Command Center
  2. Cut and Paste
  3. Labeling
  4. Turtle Move
- B. Highlights of other features
  1. Text with graphics
  2. Music
  3. Shapes page, contains both blank shapes and pre-designed shapes that can be edited.
  4. Tools pages
  5. Scrapbook disks

C. Teacher and Student Support Materials
  1. Teacher's manual
  2. Reference manual
  3. Bi-monthly newsletter
  4. Site Licensing for both the school and students
  5. Student books
  6. Student Task cards (open-ended assignments)

II. Using graphics with young children

Logo has always given teachers the ability, through programming, to make Logo more simple for small children to use. The concepts the children learn are the same, but the extent of typing required can be reduced in this manner. This section will cover ways to adapt LOGOWRITER for young children.

A. Sample programs
  1. Easy Draw
  2. Draw
  3. Jessica
  4. Turtle Story
  5. Shapes
  6. Programs that enable children to use one letter commands to design maps, houses, school scenes, holiday pictures, etc.
  7. Music as rewards

B. Directionality
  1. Robots
  2. Mazes
  3. Transparencies

C. Using the shapes page
  1. Editing existing shapes
  2. Creating new shapes
  3. Simple programs to animate shapes

III. Word Processing

"Word processing enriches the environment of Logo programming activities. Text becomes an object that is interesting and can be easily manipulated and changed." LOGOWRITER Teacher's Manual

A. Kindergarten children can use LOGOWRITER to match pictures with the beginning or ending letter. Sample programs will be demonstrated.

B. First grade children can draw a picture and label the objects in the picture. More advanced children can carry the activity as far as they wish.

C. Second grade children can draw pictures, write sentences to make a story that can be printed out and formed into a class or individual story book.

IV. Examples of things done on higher levels.

V. Question and answer period

ANIMATION OF MATHEMATICAL CONCEPTS IN FIRST-YEAR ALGEBRA

VICKI PAYNE, *The University of Texas at Austin*

Two lessons developed for first-year algebra will be presented demonstrating the animation capabilities of the Macintosh computer for instruction in concept formation.

Lesson 1: To illustrate the graphical representation of relationships between quantities, two different situations involving time and distance are presented using the animation of a car traveling along a roadway and a ball dropping from a cliff.

Lesson 2: To illustrate the roles of the x-coefficient and the constant in a linear function, animated graphs of $y=x+b$, $y = ax$, and $y = ax + b$ are produced illustrating the roles of the constants **a** and **b**.

(These lessons will be available to be copied during the session if a 3.5" disk is furnished.)

To many first year algebra students an equation is an abstract combination of symbols. The underlying relationship of the represented quantities is usually lost in a myriad of techniques used to solve equations. Many of the abstractions can become more concrete with the computer's ability to animate objects. Utilizing the new technologies of the MacIntosh computer and the programming language of Microsoft BASIC™, objects can easily be animated. The examples below are a sampling of what is possible:

> Often a teacher simply states the relationship of distance-rate-time as, "Distance equals rate times time." A more effective presentation of the idea is demonstrated by an animation program that *moves* a car on a roadway and measures distances at specified time intervals. When the data obtained is tabulated and graphed, the student can easily grasp the relationship and conceptually link the equation with the relationship.
>
> Another relationship of distance-rate-time can be depicted by the animation of a ball dropping from a cliff while the computer calculates the distance traveled during different time intervals. The computer displays the ball dropping faster in each successive time interval. When this example is compared with the car example, students see from computer generated graphs that the relationship of distance-rate-time is different for the ball than for the car.

To illustrate the roles of the x-coefficient and the constant in a linear function, graphs of equations of the form y=x+b, y=ax, and y=ax+b are generated utilizing different values for the terms **a** and **b**. First, graphs of equations of the form y=x+b are produced letting **b** take on values between -5 and 5 in increments of 0.25. As the graphs *move* up and down, the student's attention is drawn to the y-intercept by a hand. The value of **b** is *seen* as determining the y-intercept. It is noted at this point that all graphs of equations of the form y=x+b are parallel (i.e., have the same slope).

Using y=x as a line of reference and graphing equations of the form y=ax where **a** takes on values increasingly greater than one, the student *sees* that the lines have progressively steeper slopes for larger values of **a**. A similar series of graphs is shown for values of **a** in the intervals (1,0), (0,-1) and (-∞,-1) utilizing the graphs of y=x and y= -x as reference. In this way students *see* how the x-coefficient affects the graph of the function. The slope and y-intercept become quite evident as the simple functions are graphed, and generalizations are easily made by the student.

These are but a few examples of abstract concepts made more concrete by using the animation capabilities of the MacIntosh computer. As the lessons that incorporated animation techniques were written, a wealth of ideas came with each topic. The instructional medium of the computer promises to become much more than just a "drill-and-practice" machine or an "electronic page-turner." It offers a new generation of instructional techniques that incorporate old concepts into a framework with new insights.

Can Computer Math Be Fun?

Gay Smith, Teacher
West Texas High School
Cathy Cole, Teacher
Borger High School

Computer Math can be more than just another math class. To allow students to experiment with tool, graphics, and programming techniques using BASIC, projects and activities can be assigned allowing students to be creative and innovative. This presentation will present ideas for projects and activities and samples of student projects will be shown. Also a demonstration on Turbo Basic will be given with a short discussion on how it can be used in the classroom.

****

After the students become familiar with the keyboard, I ask them to run a program that asks for information, stores the answers on disk, and prints the results. It has an opening graphics screen welcoming them to Borger Bulldog Lab and plays the school song. This program not only gets information for me to use (their schedule, previous math classes taken, hobbies, extracurricular activities, etc.) but also give them experience in using software, shows them some of the capabilities of the computer and the printer.

There are three major programming assignments that I do with first year students. After learning most of the BASIC commands, I teach the on K GOSUB statement. The students are to write an interactive program of their own design in which the computer asks questions of the user, gives the user four or more possible answers according to his choice of answer. The program must be well-documented and structured. I allow two to three weeks for this assignment.

From Thanksgiving until Christmas, the students write a program to produce a Christmas or winter scene with music playing in the background.

The entire last six weeks is spent on a project of the student's own design. The student hands in his plan for approval. The program must be well-documented and structured. The final examination is three-fold. Each student presents his program to the class, pointing out what he most enjoyed and what he found most difficult in writing the program. Each student also turns in an evaluation of each of the other student's programs and presentation. He also hands in a listing and a run, if appropriate. Thus he is graded on his program, his presentation, and his ability to evaluate softward.

Cathy Cole

My computer math class this year presented a problem so many computer classes have in common. Each student brought a different level of computer knowledge and expertise with him or her. Also none of the students had worked on an IBM computer system before. We started the year learning to use this specific computer. The workbook that is issued with the computer literacy book by MacMillan designed for use on the IBM (also available for other computers) was our starting point. After a week of learning the computer, the students were assigned a project to be completed by the end of football season. The difficulty of the program would depend on the student's knowledge of BASIC programming. Ours was a newly consolidated school district and much emphasis had been place on school spirit. The first project was to be designed to promote school spirit. The finished project would be saved on a disk and a grade would be given. Some students used print statements to program their projects, while others used color graphics, animation and music. Books on programming such as A Guide to Programming the IBM Personal Computer by Bruce Presley, Lawrenceville Press (also available for the Apple), were made available for the students. Each Friday is catch-up day for regular assignments as well as project work.

The next project was to have a Christmas theme and everyone was to use graphics for this assignment and it was to be due at the end of the semester. The third project is to be a game. Books will be made available for ideas and modification depending on the student's ability. The more advanced students will create their project using Turbo Basic. This is a new program for the IBM put out by Borland Company and is an exciting program using new programming techniques such as programming without line numbers, and using some of the editing features contained in WordStar.

Gay Smith

COMPUTER MATH PROJECTS

Joan Bounds
Sinton ISD

This session will focus on:

Projects suitable for a computer math class.
The purpose of computer math projects.
Student instruction sheet
Evaluation of projects
Sample projects displayed on computer.

The purpose of computer math projects is to review, reinforce, and extend ideas from the secondary mathematics curriculum.

In the process of writing project programs students explore and develop their own algorithms for solving all kinds problems.

Semester projects should be required. Students are given a list of possible topics from which to choose. Students are not restricted to this list, but their topics must have the teacher's approval. No two topics should be the same. When the projects are completed, each student will put his/her program on the network for the class. The writer must be able to explain and defend the program when questions are asked by classmates.

Student evaluation is important and necessary. Therefore an instruction sheet with the project requirements and the method of evaluation should be given the students before they begin their project.

Participants will review some projects on computers and examine the notebooks containing the required information.
Copies of suggested projects, term project requirements and grade sheet will be given.

Computer math projects can help students acquire a deeper understanding of the concepts developed in the mathematics curriculum. It results in opportunities for creativity by exploring and using computer capabilities. For the teacher, such an approach brings the reward of seeing the output:

MATHEMATICS LEARNING TAKING PLACE!

**** COMPUTER MATH -- AN 8th GRADE ELECTIVE **** PROBLEM SOLVING with BASIC PROGRAMMING

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The presentation will explore the concept of an eight grade mathematical problem solving course using the BASIC language. The specific goals of the course are to provide a background in BASIC programming and develop problem solving techniques. This will be a continuation of the BASIC programming introduced in Computer Literacy. Emphasis will be on structured programming and problem solving using mathematical concepts. A course outline, type of problems used, and the method of instruction will be presented and discussed.

****

After Computer Literacy, what computer related courses are available? None, until the student finishes Algebra I or enrolls in a Business Education course. For many students, Computer Literacy will be their and last computer course. Typically BASIC programming is not available as a high school course and computer courses are not available to the 9th grade student unless the student has completed Algebra I. If a student has the desire and/or need to learn BASIC programming it would be on his own initiative. The solution could be the introduction of an elective problem solving/computer programming course.

This could be an 8th grade elective course sharing the computer labs established for Computer Literacy. In a one semester course three of the four programming structures can be introduced and used; 1) sequence, 2) selection, and 3) the loop. The fourth 4) a procedure could be left for a more advanced programming course.

The course would be an extension of the BASIC programming introduced in the Computer Literacy course with emphasis on using the computer and BASIC programming as a problem solving tool. The students would use algorithms, flowcharts, problem solving techniques, and the syntax of a high level computer language-BASIC to solve mathematical problems.

GOALS: Develop problem solving techniques and provide a background in BASIC programming.

- To practice problem solving techniques, trial and error, patterns.
- To write algorithms for problem solving.
- A continuation of the BASIC program introduced in Computer Literacy.
- Emphasis on structured programming and problem solving using mathematical problems.

OBJECTIVES:

- * Write and develop algorithms.
- * Create and interpret flowcharts.
- * Develop problem solving skills.
- * Learn the syntax of a high level language.
- * Apply the syntax of a programming language to problem solving situations.
- * Interpret program instructions.
- * Find and correct program errors.
- * Write reasonably structured programs.

The following keywords(verbs), commands and functions can be introduced and used in a one semester course:

KEYWORDS: REM, PRINT, END, LOCATE, TAB, LET, INPUT, READ...DATA, IF...THEN, WHILE...WEND, and FOR...NEXT.

COMMANDS: RUN, LIST, NEW, EDIT, RENUM, DELETE, SAVE, MERGE, LOAD, COPY, and FILES.

FUNCTIONS: SQR, INT, and RND.

Computer programming is the process of planning a sequence of instructions for a computer to follow. To write the instructions we must go through a certain process, a problem solving phase and an implementation phase.

In the problem solving phase we must:

- * Analyze--Understand and define the problem.
- * General Solution--Develop a logical sequence of steps (algorithm or flowchart) to solve the problem.
- * Test--Follow the exact steps as outlined to see if the solution truly solves the problem.

In the implementation phase we must:

- * Write the program--Translate the algorithm (flowchart) into programming language code.
- * Test--Have the computer follow the instructions, check the results and make corrections until the program solves the problem.
- * Use--Use the program for problem solving.

The steps in the program development cycle are very similar to the steps in problem solving. This will help develop the students ability to write logical sequences and reinforce their problem solving skills. The computer cannot analyze a problem and come up with a solution. The problem solving must be done by the programmer.

GRAPHICAL SOLUTIONS TO ALGEBRAIC EQUATIONS

VICKI PAYNE, *The University of Texas at Austin*

A lesson on using computer generated graphs to solve equations will be presented in conjunction with a graphing program which can graph most functions including polynomial, step, trigonometric, logarithmic and exponential functions. In the production of the graphs, the graphing program can utilize rectangular or polar coordinates with the axes displayed or hidden and can re-scale, re-center, and print the graph.

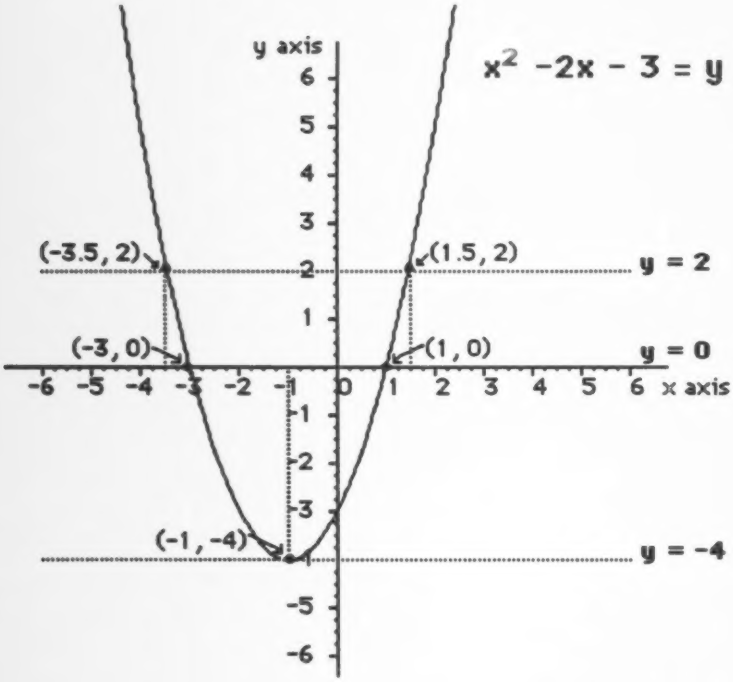
(The lesson and graphing program will be available to participants in the conference if a 3.5" disk is furnished.)

Just as the hand-held calculator reduced the need for extensive arithmetic drill, the computer shows the same promise for algebraic manipulation technique skills. As an instructional aid, the computer can contribute powerful new tools for both complex calculations and symbolic transformations. Because many mathematics educators believe that the understanding of underlying concepts is essential to true problem solving activities, it seems unwise to let students use these devices without a conceptual foundation. In addition to the ability to calculate quickly, recent technological developments have given the computer the ability to produce graphs of different functions in a context which enables the student to visualize data without executing the computations. By taking advantage of these new capabilities, a lesson was designed to allow the student to develop an understanding of many concepts associated with finding solutions to problems using computer generated graphs.

The lesson entitled "Finding Solutions to Polynomial Equations Using Graphs" is described as follows:

> By using the computer's ability to graph functions, students are taught that the solutions to $f(x)=k$ are the points of intersection of the graphs of $f(x)=y$ and $y=k$, where k is some constant. For example, to find the solutions to the equation $x^2+2x-3=k$, students are given the graph of $x^2+2x-3=y$ and $y=k$ as shown in Figure 1. The solutions to the equation $x^2+2x-3=2$ are seen as $x=-3.5$ and $x=1.5$ by using the

graphs of $x^2+2x-3=y$ and $y=2$. Using the graphs of $x^2+2x-3=y$ and $y=0$, the solutions to $x^2+2x-3=0$ are seen as $x=-3$ and $x=1$. Similarly, the figure also shows there is no solution to $x^2+2x-3<-4$. These solutions are approximations, but the concept of what a solution indicates is more fully elaborated than instruction of manipulative techniques alone. The generalization of the technique to higher order polynomial equations is easily grasped by the students.



Equation	Solution
$x^2 +2x-3=2$	$x=-3.5$ or $x=1.5$
$x^2+2x-3=0$	$x=3$ or $x=1$
$x^2+2x-3=-4$	$x = -1$
$x^2+2x-3<-4$	no solution

FIGURE 1

With access to a graphing program that can produce graphs of most functions, students have a resource that will enable them to find approximate solutions to many different types of equations without the skill involved in solving such equations. The graphs can also be used to illustrate additional concepts such as inequalities, factors of polynomials, symmetry, and periods of cyclic functions. With such a resource, the curriculum could then focus on mathematical modeling utilizing real data that is representative of the more common functional relationships.

PROBLEM SOLVING SOFTWARE FOR USE IN TEACHING COMPUTER MATH

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The Essential Elements and Objectives for Computer Math I emphasize the use of the computer as a tool in solving mathematical problems. Teachers are encouraged to use commercial software packages in addition to student-written programs to satisfy the requirements of the essential elements.

This presentation demonstrates the use of five commercially available software packages in teaching Computer Math I. Four of these packages, including MATHPAK, INVESTICALC, LOANPAK, and THE SCIENTIFIC ROUTINE MACHINE are available from Software Express of Merrifield, VA, for less than $5.00 each. The other is EUREKA:THE SOLVER from Borland International of Scotts Valley, CA, and sells for $99.00.

INVESTICALC is a software package available from Software Express, P O Box 2288, Merrifield, VA 22116. Purchased alone, it sells for $7.95. Purchased with two or more other programs, it sells for less than $5.00. INVESTICALC is a compiled program which uses a windows format. It is menu driven, and after selecting an option from the menu, a window opens up prompting input of the necessary information. After information has been entered, the calculation is done and the answer(s) is displayed in another window.

The main menu of INVESTICALC offers nine choices, as follows:

1) Future Value of an Investment
2) Future Value of an Annuity
3) Regular Deposit for Savings
4) Withdrawals from an Investment
5) Minimum Investment for a Cash Sum
6) Minimum Investment for Income
7) Compound Rate of an Investment
8) Effective Rate of an Investment
9) Future Value of an Annuity Due

The program calculates accurately and quickly, and is very easy to use. It is applicable for use to satisfy essential element 3G -- investments.

LOANPAK is another software package from Software Express, which is priced the same as INVESTICALC and operates in a similar manner. The LOANPAK menu is as follows:

1) Loan Analysis, Missing Factor
2) Calculate Regular Loan Payments
3) Calculate Last Loan Payment
4) Calculate Remaining Loan Balance
5) Calculate Loan Term
6) Mortgage Amortization Table

This program also calculates accurately and quickly, and is very easy to use. The Missing Factor option allows you to leave any one factor blank and the program calculates the missing factor. This program is applicable for use to satisfy essential element 3E -- loans and charge accounts.

SCIENTIFIC ROUTINE MACHINE is still another program from Software Express -- same price, same operating format. It offers a menu of calculations in four categories -- Distance & Measurement, Energy & Weight Conversions, Physics and Geometry Conversions, and Electronics.

The one of most interest for use in Computer Math I is Geometry Calculations. It permits calculation of area of geometric figures such as circles, triangles, and rectangles, and volume of spheres, cylinders, cones, etc.

An interesting feature of this program is that it displays a BASIC program for calculating the answer along with the answer. Again, it is easy to use and applicable to essential elements 5B and 5D -- calculating areas and volumes.

MATHPAK is a $2.50 program from Software Express. It is menu driven, but does not use windows. It permits 20 mathematical calculations of various types. Those of interest for Computer Math I include arithmetic mean (7C,4G), geometric mean (4G), and permutations and combinations (7A).

EUREKA:THE SOLVER is a powerful equation solving and graphing program from BORLAND International, 4585 Scotts Valley Drive, Scotts Valley, CA 95066. It sells for $99.00 but can be found for approx $65.00 from discount software sources.

EUREKA is so powerful that it takes a while to learn to use it. It is not difficult to use, but it has many options and built in functions. It will solve virtually any equation and graph most any function. Printed reports are also available.

I have used EUREKA in my classes to do the following:

** Find x and y intercepts of the graph of a linear equation (4C).
** Solve a linear equation, and a system of linear equations (4E).
** Solve any polynomial function (4H).
** Solve quadratics and systems of quadratic equations (4I,4J).
** Graph linear, quadratic, and polynomial functions (4D).

STUDENT PROJECTS

Joan Bounds

Sinton ISD

This session is a continuation of the session on Computer Math Projects. Participants will have hands-on experience examining a variety of student projects. Student documentation will also be available for examination.

Students, after consultation with the teacher, will decide on a problem-solving project related to a mathematics topic. This project will involve the following:

1. Research the topic for a thorough understanding of the algorithm.
2. Write an analysis-plan of the problem or construct a flowchart.
3. Design the program on a coding form, including complete documentation.
4. Enter the program into the computer.
5. Evaluate the output through sample runs.
6. Test and debug the program.
7. Print the program and a sample output.
8. Display program on the network for the class and give an oral presentation of the program. Students must be able to answer questions and defend their product.

Computer Math - Honors.

The higher level and critical thinking skills, analysis, synthesis and evaluation will be required in the projects for students in the honors program. Their problem-solving projects relate to an advanced mathematics topic.

Topics to be reviewed are: The Area Under a Curve, Plotting Paths of Projectiles, CAI programs, operations on matrices, encoding and decoding messages, solving triangles using trigonometric functions, geometric shapes, games, and others.

Technology in Junior High Mathematics Teaching

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ABSTRACT

Calculators are probably the only technology that is readily available in virtually all middle/junior high school mathematics classrooms. Computers are available at least for demonstrations in many classrooms, and videodisc players are increasingly available for teachers to use with whole classes. Each of these technologies has a useful role in teaching mathematics in junior high school. Sample activities for use of calculators and computers (the most common available technology) are presented.

Calculator Activities

1. Here are some keystroke sequences to repeat. Write down the ones digit after each press of the = key. Start each sequence with 1.
   a. press x, press 5, press =
   b. press x, press 2, press =
   c. press x, press 3, press =

   How many different digits does each sequence produce before the digits repeat? Can you write down other keystroke sequences which repeat only one digit? Two digits? Four digits? All 10 digits?

2. Play the following game as a whole class activity. Ahead of time, write 100, 200, 300, 400, 500, 600, 700, 800, and 900 on slips of paper and put them in a bowl at the front of the room.
   a. Tell each student to pick a 4-digit number and key that number in her/his calculator.
   b. Draw a slip of paper from the bowl and read the number to the class.
   c. Tell each student to write down an estimate of the quotient of her/his number divided by the number drawn from the bowl. Don't allow more than one minute for this.
   d. Tell each student to use the calculator to divide her/his number by the number you read and then to subtract her/his estimate from the computed quotient.
   e. Award one point to the person whose difference is smallest, disregarding the sign.
   f. Play several rounds.

   This game is designed to help students estimate computations. One strategy that you might want to discuss is to divide by 100 (or simply move the decimal point), drop the decimal part of that quotient (or round to the nearest whole number), and then do an approximate division by a single digit (namely, the first digit of the number you drew from the bowl). Then compensation of the computed answer can be made. For example, if I enter 8563 and you draw 300, I will think 86 divided by 3. Since 87 divided by 3 is 29, then I need to adjust down, so I'll guess 28.35. (Ans: 28.54333)

3. How many times can the square root key be pressed before the result is 1? Enter a big number and continue to press the square root key until the result is 1. Keep track of the number of times you press the square root key. What happens if you use a number half as large? One-tenth as large?

4. One way to explore the error in calculator computations is to compute a/b times b/a on a calculator. Mathematically, the answer should be 1, but do calculators always get this answer? The product is easy to compute on a four-function calculator with a memory key. For example, for 3/7 x 7/3 :

   3, /, 7, =, STORE (store result), 7, /, 3, =, X, RECALL (recall previously stored result), =

   On most inexpensive calculators, the result is .9999999 rather than 1. Truncating has caused some information to be lost, with the result that the answer is not quite right. The difference is relatively small, at least for most purposes. The result also illustrates the mathematically well-known fact that .999999 (infinitely repeating) is actually equal to 1!

5. If you press the square root key once and then square the result, do you get the number you started with? If you press the square root key twice and then square the result twice, do you get the number you started with? Does this work if you do this three times? Four times? This activity can also lead into a discussion of rounding error.

Computer Activities

6. One prerequisite for "working backwards" or "top-down" problem solving is understanding relationships between concepts and examples of concepts. Many different opportunities for working with relationships are needed for the process to proceed smoothly. Relationships can be either superficial (e.g., figures in textbooks are all about the same size) or structural (all isosceles triangles have two equal sides). Story editing (through word processing) provides one setting for dealing with both superficial and structural relationships. For example, the following paragraph could be the beginning of a story about a family of squares.

   > Once upon a time there was a family of squares: Sam Square, Sara Square, and their two children Sally Square, and Sandy Square. Sam had four right angles and Sara had four straight sides. They both had diagonals that met in the middle, a fact not unusual for squares. Sally and Sandy had very sharp corners and were constantly bumping into things.

   Students could be challenged to edit the story so that it was about equilateral triangles (or hexagons, or circles, etc.). The description of the corners as "sharp" is not a unique feature of squares; the same might be said of equilateral triangles. The fact that the diagonals meet in the middle, however, would not apply to triangles, since triangles do not have any diagonals. Editing the story forces students to analyze the relationships between concepts and to decide which ones are necessary to change and which ones are appropriately left "as is."

7. Database software can be used to explore properties of numbers. The fields for the records would include at least: (a) list of divisors, (b) number of divisors, (c) list of prime divisors, (d) number of different prime divisors, (e) nearest smaller prime, and (f) nearest larger prime. The database could be created over a relatively long period of time; it would not all have to be done at once. Once completed, the database can be searched for patterns. For example, which numbers have an odd number of distinct divisors? (Ans: 1, 4, 9, 16, 25, 36, etc.) What property do they all have in common? (Ans: They are all perfect squares.) Other questions that might be posed are:
   - a. How many numbers are exactly in between two primes?
   - b. What kinds of numbers have only 4 distinct divisors?
   - c. What kinds of numbers have only 1 prime divisor?

The Macintosh as a Resource
for
The Mathematics Teacher

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The University of Texas at Austin

Ready access to a large data base combined with high resolution graphics make the Macintosh particularly useful as an aid for teaching mathematics. The speaker has developed and/or collected a series of programs for use in record keeping, test construction, overhead transparency preparation, student handout preparation, function graphing and a variety of simulations which greatly enhance a mathematics teachers resources for organizing and improving the quality of instruction. The emphasis of the presentation is on the versatility of the computer, its ease of use and its power for improving instruction in mathematics. Bring your blank discs.

If you are an experienced school mathematics teacher, then you have felt the frustration of trying to maintain up-to-date records of your student's achiement, of searching for last year's 2nd six-week test in algebra in order to modify it for this year's class, of determining an unfamiliar pythagorean triple, of finding all the prime numbers between 90 and 100, of trying to draw a figure on a ditto master after the test has been typed, of estimating the cube root of 5, of drawing the graph of $y = x^2 + 4$ on the chalkboard and wishing, if you had time to draw the other graph, you could have your students study the graph of $y = -x^2 - 4$. All of these situations and many others are now readily manageable on the "MAC."

You can create your own file of "pictures" for overhead transparencies or for dittos with one-minute access. You don't need separate stores of ditto paper and graph paper, because you can produce graph paper (in whatever form you wish) for an entire class in minutes. You can figuratively cut and paste old problem sheets or old tests, make editorial changes and produce new documents also in minutes. What is most valuable is that your data base of resources, exercises, instructional demonstrations, etc. grows year after year. Instead of retyping a "last year's" handout, your time can be spent revising and improving it while retaining all the good material.

With a Mac, MacPaint, MacWrite and MS BASIC you are ready to begin a resource file that will aid you for years to come. MS BASIC provides access to the MAC's remarkable toolbox and lets you produce fantastic graphs of mathematical functions. With BASIC you can create such aids as Magic Squares, tables of prime numbers, geometric figures and a variety of other useful aids, all saved as either document or picture files and ready for immediate screen display, overhead transparency production, or printing to ditto masters. You can also create files for student records, you own current file of addresses, inventories of classroom equipment and supplies. Finally you can develop your own dynamic presentations that may used on either an individual student, small group or lecture-demonstration basis.

VIDEO DISK: A TOOL FOR MATHEMATICS

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Core Concepts Video Disks for Mastering Fractions, Decimals & Percents, Ratios and Word Problems are presented to show how any 5th-9th grade math teacher can lead his/her students to mastery in these key areas. This course, enhanced by the video disk technology, is an effective method of teaching to mastery using proven Direct Instruction Methods which are easy to implement and integrate into existing curriculum.

In an age when schools have been told to redesign to meet the needs of a technological society, video disk based technology has provided us with a tool and Systems Impact has provided us with the software products which are characterized by several important considerations.

A concern for student outcomes, a concern for the central role of the teacher, a concern for the realities of cost and productivity and a concern for the practices and strengths of public schools are some of these considerations.

There are several levels of video disk products, and these levels will be discussed and compared as to their effectiveness and consideration for the above concerns.

The programs demonstrated in this session combine core content and sound instructional design with the power of the videodisc to teach fundamental principles of math. It will be evident that the inexperienced and experienced teacher alike will benefit from the use of this tool.

Information will be shared on the use of these programs in other schools around the country and several advantages of using this technology will be demonstrated.

WHAT DO YOU SUPPOSE IS A CONJECTURE?

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Practical, usable ideas on building and fostering students' desire to explore the centrality of conjecture to the making of geometry will be presented. Exploration of software which makes the formulation and testing of conjectures fun, inviting and enticing will be incorporated. Use of this software should result in dramatically different mathematical behavior by students with advancement in critical thinking skills.

Based on practical tried and true experiences, the material will be presented in an organized manner that will allow the instructors to create an environment in which conjecture is a natural activity. This two hour lab will provide hands-on experience with The Geometric Supposer, a new program by Sunburst which integrates computer technology and the guided inquiry method into the geometry curriculum. A description of the use of the The Supposer, the text and sample supplementary worksheets, including benefits and drawbacks, will be presented. The material will be presented with actual student ideas and examples. The Geometric Supposer is most effective as a student tool in a computer lab setting; it can illustrate relationships, support student conjectures, show counter example, and lead students to an intuitive understanding of proof. For example, as soon as a student says, "I wonder if this is always true," he/she has developed his/her own theorem and simultaneously discovers the need for a proof that would cover cases. Developers noted this result:

> Rather than disdain the need for proof, as some might fear, the students internalized the need for knowing that was more powerful than demostration in particular cases. "I think it is true. I hava a lot of case, but I need a proof!"

The small group learning approach to instruction encourages mathematical exploration and problem solving. It facilitates creative thinking, risk taking, critical thinking, and the sharing of ideas-all of which are important factors in mathematical problem solving, but attributes often overlooked in the traditional geometry curriculum.

You CAN Get There From Here
Structuring BASIC by Eliminating the GOTO

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Once the decision has been made to teach the BASIC language as a problem solving tool at the high school level, a fundamental decision must be made on HOW MUCH STRUCTURE to teach in the language. It is suggested here that the language will be of much tighter structure if the GOTO statement is eliminated.

It is questioned in some circles, particularly at the college level, whether BASIC should be taught at all as a first year programming language. It is not the purpose of this paper to resolve this debate -- but to assume the decision has been made to teach BASIC, at least at the high school level, and to offer thoughts on the pros and cons of teaching a more structured BASIC with the elimination of the GOTO statement.

The notion of eliminating the GOTO statement is not particularly new. Indeed, some of the "newer" BASIC's such as Turbo Basic and TrueBasic offer the programmer the "no line number" option -- thus eliminating the GOTO statement.

If one is teaching from a system that does not allow the elimination of line numbers, then it is incumbent upon that instructor to make it clear to students that the GOTO statement is not allowed without an academic penalty being exacted.

Perhaps most computer programming teachers have not only heard of the term "spaghetti BASIC" but have had to endure the rigors of trying to read and interpret such code.

What is "spaghetti BASIC" (if you're not familiar with the term)?. Suppose you have a program with 99 lines of code. You write three columns of line numbers: 1 - 33 in column 1, 34-66 in column 2 and the remainder in column 3. Consider those numbers as vertices in a directed graph. Starting with the first line of your program, draw the directed edge to the next line executed in the program and from there to the next line executed and so on until you have done so for all lines. If your program has any considerable amount of GOTO's throughout the code, you may very well have what looks like a plate of "spaghetti" when you're finished.

Please note, the suggeston of eliminating the GOTO does not include eliminating the GOSUB. And, with the GOSUB statement still intact, the teacher will not hunger for "spaghetti", but it is suggested here there will be considerably less "noodles".

It must be emphasized here, however, that the primary gain in eliminating the GOTO is not less "spaghetti", but more concise, tightly structured problem solving techniques. I suggest this is of particular importance if the very reason for teaching a programming language in the first place is to enhance the students' abilities to think in the abstract as a problem solver -- and not to teach the student to become a programmer as the primary objective.

In brief, the techniques that allow the elimination of the GOTO include placing major emphasis on subroutines, While loops and Boolean variables.

To cite a simple example: suppose the students are programming a "Guess the Number" game -- the computer picks a number from 1 to 100 and the player has not more than 5 chances to guess the number (as an aside here -- this is an excellent opportunity to teach students the notion of a binary search). For the beginning student, their first instinct likely is to include a line such as `FOR I = 1 TO 5` to control the number of guesses. This MAY cause a problem for the student if the user guesses the secret number on any of the first 4 guesses -- how to get out of the loop to avoid subsequent guesses. Incidentally, I consider an assignment statement such as I = 6 to be an "artificial" GOTO since it has the affect of artificially ending the loop.

On the other hand, lines such as:

```
WHILE GUESS <> SECRETNUMBER
                or
WHILE GUESS <> SECRETNUMBER AND WIN$ <> "TRUE"
```

offer a much more concise, logical approach to the problem and certainly no less flexibility.

Another, perhaps less trivial example not involving a "game" would be in regards to searching for certain keys among lists of data (be it an array or "external" Sequential or Random Access file). During the search, instead of the perhaps usual first-year approach such as `IF KEY IS FOUND THEN GOTO ****` why not approach it on the basis of `WHILE FOUND$="FALSE"` and then altering the Boolean Found$ to TRUE if and when the key is found.

It seems for any gain (i.e., the structure, tighter programming/problem solving techniques, etc.), there always seems to be some loss. This probably is true here as well.

If major emphasis is placed on subroutines (and this is particularly important if BASIC is being used as a foundation for Pascal), your loss is one largely of memory. This may or may not be a problem depending on the BASIC software being used (i.e. IBM PC BASIC limits user to 64K while TrueBasic, for example, overrides this limitation and provides all RAM resident on your PC such as 256, 512 or 640) and size of programs being written.

If the teacher is not experienced in teaching BASIC, it is perhaps a little more difficult to restrict use of the GOTO.

Finally, for the experienced teacher of BASIC who has allowed the GOTO but chooses not to in the future, this may mean rewriting or minimally modifying a filing cabinet full of quizzes, tests, transparencies, hand-outs, etc. To this I offer a thought I frequently quote to my students: "If it is important enough to you, you'll get it done."

A VACATION-AN EDUCATION

A MASTERS DEGREE IN COMPUTERS IN EDUCATION

Ruth Ann Jones
Computer Liason, Cypress-Fairbanks Schools
Henry Jones
Computer Electronics, Spring School District

An excellent way to enjoy your summer while working toward a Master's Degree in Computers in Education, Shenandoah College and the area around Winchester, Virginia offer a boundless opportunity to explore the rich historical heritage of the Revolutionary and Civil War periods of the United States.

In 1744, the first official English city west of the Blue Ridge Mountains was founded by Colonol James Wood, who named it after his birthplace, Winchester, England. In 1748, George Washington began surveying, using Winchester as his headquarters. Over the past two hundred years the city has changed very gradually. It's old world charm and proximity to nearby areas such as Gettysburg, Harpers Ferry, Mannassas, Blue Ridge Parkway, and Washington, D.C. make it an ideal center of operations from which to explore the rich Revolutionary and Civil War heritage of the area. Shenandoah College, founded in 1875, is located in the heart of historic Winchester. Shenandoah has about 130 faculty members with a student-faculty ratio of about 9 to 1. It offers nearly 50 programs of studyand grants 12 degrees including a Master of Science in Computers in Education. This program focuses on research, curriculum developement, and improvement of instruction. Upon completion of the program, graduates will be qualified to serve as research teachers, curriculum specialists or supervisors in the use of computers in science and mathematics education. The program is a 15-month program for full-time teachers, requiring a minimum of two summers and two courses during the intervening school year which may be completed at home.

APPLE UNIFIED SCHOOL SYSTEM

Bruce Farrall
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The "Apple Unified School System" is a new education program from Apple Computer designed to provide schools with comprehensive computer solutions for instruction, administration, and teaching.

The program brings together hardware, software, and training materials that will enable schools to:

- Move easily toward integrating computers into the educational curriculum,
- Provide school administrators with powerful business solutions, and
- Encourage the use of computers as individual teacher-productivity tools in the classroom.

In addition, the program gives all educators and administrators the opportunity to purchase an Apple Computer for their personal or professional use.

Instruction Included

Along with the configurations of the Apple II family of computers currently offered under Apple's Education Purchase Program, the instructional segment of the "Apple Unified School System" will offer teachers easier access to curriculum software.

If they are unable to find just the right software to correlate with their classroom topics, they can use one of the Apple Curriculum Software Guides to locate the software. Each easy-to-understand guide includes a curriculum matrix, product descriptions, and purchasing information.

Apple is offering guides for Science, Reading, Writing, Language Arts, and Mathematics.

Some teachers may want additional help in locating software to integrate with daily activities in their classroom. To assist teachers in taking the first step in selecting software, Apple will be offering several "Apple Learning Series."

- Early Language,
- Health Education, and
- Life Science.

In addition to the software, each series comes with a Teacher's Manual and a training offer to assist the teacher with the process of integrating technology into their daily activities.

Administrative Solution

The "Administrative Solution" features the new "Macintosh SE Administrator's Office" System. It's designed to provide administrators with additional power and capabilities, including connectivity, desktop communications, and desktop publishing. The hardware components include:

- One Macintosh SE with two internal floppy drives,
- One Macintosh SE with a floppy drive and an internal hard disk,
- Two Apple Keyboards,
- A LaserWriter Plus printer, and
- The AppleTalk network.

Administrators can use the Macintosh SE to handle budgeting, inventory and payroll, student attendance, health records, presentation graphics, correspondence, and newsletters. The software component, highlighting solutions for administrators, will feature third-party software and training materials.

Teaching Tools

The "Apple Unified School System" offers schools the opportunity to purchase Apple IIGS systems as professional tools for teachers' desktops to help them manage information in the classroom, and as a personal productivity tool for projects such as writing letters to parents or tracking student progress.

The Apple IIGS is an ideal tool for teachers because it allows them to run the same Apple II software used by their students. And with the Apple IIGS computer's Macintosh-like interface, it's easy to use. The hardware system features the Apple IIGS with:

- 512K memory,
- A 3.5-inch disk drive for taking advantage of new software,
- A 5.25-inch drive to run existing Apple II software,
- An AppleColor RGB Monitor, and
- An ImageWriter II printer.

Special Purchase Program for Educators and Administrators

The "Apple Unified School System" also includes a special purchase program for teachers and administrators in elementary through higher education institutions. This "Educator Buy Program" gives teachers, principals, administrators, deans, and any other full-time educators the option to break away from their sometimes hectic school environment and continue their work in the quiet and comfort of their own home.

APPLES' NEW HYPERCARD:
AN EXCITING NEW TOOL FOR EDUCATION

Rich Park
Senior Systems Engineer
Apple Computer, Inc.

Discover the potential of Apple Computer's new HyperCard Software for the Macintosh. This session will explain the concept of this new system and explore avenues of educational potential. HyperCard is part of every new Macintosh Computer. It must be seen to appreciate and used to understand.

Apple's HyperCard is being touted as many things... A Data Base, "The Freedom to Associate", "An Information Navigation Tool"... to cite a few. The truth is HyperCard is a system that is limited only by the user's creativity and extends that creativity to the fullest without the necessity of a technical background.

HyperCard is fundamentally structured much like a library card file. The smallest unit of information is the card, cards are built into stacks, and stacks can be cross indexed. Unlike a library card file HyperCard can find information quickly and cross references may be tailored specifically to the user's need.

HyperCard can serve as a Rolodex style index card file that stores thousands of names and addresses and can speak the information aloud when recalled. It can be a global exploration tool that allows one to click on a city in a country and discover various cultural aspects of that location. When HyperCard is connected to a Laser VideoDisk the educational possibilities explode. One can literally take a tour of an art gallery viewing works of the master artists and learn about their history. Traveling aboard a NASA Space Shuttle is possible by viewing the flight and activities of the crew of past shuttle missions. All controlled by HyperCard.

The full power of the Macintosh is tapped by HyperCard. It no longer necessary to be a member of the technically gifted to achieve true Macintosh applications. HyperCard must be seen to appreciate and used to understand.

COMPUTER SKILLS FOR THE REAL WORLD

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Randomly selected members of the American Society for Personnel Administration (ASPA) were surveyed concerning non-programming computer competencies currently required of entry-level applicants. Personnel administrators were also surveyed for their perceptions of competencies which may be required of entry-level applicants in the next five to ten years. A simple frequency distribution was used to create a rank order of the twenty-six skills included on the survey. Chi-square analyses were used to determine relationships between both the organization's type and size and each survey item. Cross-tabulated responses were used to identify changes in perceptions.

CURRENT REQUIREMENTS

Based upon the perceptions of personnel administrators, the following skills ranked as the top ten non-programming competencies currently required of entry-level applicants: 1) verify computer-generated statistics, figures, and/or results; 2) obtain a printed copy of information displayed on a computer monitor or screen; 3) enter data using all ten fingers on a standard typewriter style keyboard; 4) practice appropriate diskette handling techniques; 5) make appropriate backups; 6) enter, edit, format, and print textual material using a word processing program; 7) start a previously prepared or commercially available program; 8) retrieve or load previously stored computer activity; 9) store or save incomplete computer activity; and 10) enter new data, update old data, and retrieve existing data in an electronic filing/database management system.

FUTURE REQUIREMENTS

The following skills were ranked as the top ten requirements for future entry-level applicants: 1) obtain a printed copy of information displayed on a computer monitor or screen; 2) enter new data, update old data, and retrieve existing data in an electronic filing/database management system; 3) make appropriate backups; 4) verify computer-generated statistics, figures, and/or results; 5) store or save incomplete computer activity; 6) retrieve or load previously stored computer activity; 7) start a previously prepared or commercially available program; 8) enter, edit, format, and print textual material using a word processing program; 9) practice appropriate diskette handling techniques; and 10) interpret computer error messages and correct such problems.

RELATIONSHIP OF TYPE AND SIZE OF ORGANIZATION

Low response frequencies in some areas required that some categories be collapsed in order to render valid chi-square values. Five original categories for an organization's type were merged into three categories: Manufacturing/Production, Service, and Other (a combination of Wholesale/Retail, Education/Training, and Other). The type of organization had no statistical significance.

Five original categories for an organization's size, as measured by number of employees, were also narrowed to three categories: 1-500 employees, 501-2500 employees, and 2500+ employees. Significant chi-square values were obtained for six items. Organizations with fewer than 500 employees were more likely to disagree with requiring current entry-level applicants to produce graphic representations of statistical data using computer hardware and software. However, these same organizations were more likely to require that skill of future entry-level applicants. Organizations of 500 or fewer employees were also more likely to disagree with three other future requirements: identifying appropriate and inappropriate computer applications; verifying computer-generated statistics, figures, and/or results; and completing routine connections between computers and peripheral equipment. Organizations of more than 2500 employees were more likely to disagree with a requirement that called for future applicants to analyze a given problem and determine data requirements necessary to obtain a solution.

NON-PROGRAMMING COMPUTER COMPETENCIES INCLUDED ON SURVEY

GENERAL KNOWLEDGE ITEMS

analyze a given problem to determine data requirements necessary to obtain a solution

identify appropriate and inappropriate computer applications

decide if a given software package will operate within the limitations of a given computer hardware configuration

prepare a search strategy for locating specific information which may be obtained through commercially available computer networks/databases

verify computer-generated statistics, figures, and/or results

HARDWARE ITEMS

enter data into a computer by using all ten fingers on a standard typewriter-style keyboard

prepare (format) a floppy diskette for use

complete routine connections between computers and peripheral equipment such as printers, monitors, modems, etc.

set baud rate and printer control switches according to documentation, connect to system, and test printer

SOFTWARE ITEMS

read and successfully interpret computer software documentation

practice appropriate diskette handling techniques which protect the integrity of the software

interpret computer error messages that identify common operational problems and correct such problems

store (save) incomplete computer activity for completion at a later time

retrieve (load) previously stored computer activity for completion and/or update

make appropriate backups or copies of files, programs, and data as required

APPLICATION ITEMS

establish a system for gathering data through the use of an optical mark/barcode reader

produce a graphic representation of statistical data using appropriate computer hardware and software

enter, edit, format, and print textual material using a computer-based word processing/text-editing program

design the file structure for an electronic filing/database management system

enter new data, update old data, and retrieve existing data in an electronic filing/database management system

transmit and receive messages via an electronic mail system

use electronic spreadsheet software for hypothesis testing, inventory control, budget maintenance, and/or other appropriate applications

access and retrieve information from commercially available computer networks/databases via computer and modem

give instructions to a computer that will combine files prepared using one program with files prepared using a different program

obtain a printed copy of information which appears on a computer monitor or screen

DEMONSTRATION OF WINNEBAGO CIRC/CAT LIBRARY PROGRAM

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Winnebago's CIRC/CAT program is a combination circulation and on-line catalog program for libraries requiring an IBM/IBM compatible, MS/DOS computer with a hard disk drive, a printer capable of printing bar code labels, DOS version 2.0 or above, and a light wand. The program creates a master data base, with multiple indexing as data is entered either from the keyboard or "batch" from a diskette. CIRC/CAT performs most of the usual tasks performed by computerized circulation/catalog programs easily and well, including fine control, catalog searching by author, title, subject, or key word, circulation and reserving books for users. It has a built-in calendar which can be set to exclude days the library is closed.

CIRC/CAT is exactly what the name indicates; a combination circulation and on-line catalog program for libraries. In addition, it is an easily installed and executed program. It has been on the market since September 1986 and is a progression from the Winnebago LCS III which has been available for several years. The program has many good features, especially for the school librarian, which will be demonstrated. In the eighteen months that the program has been marketed, there have been constant upgrades, many of them including techniques requested by Arlington librarians and others, and many of them accomplished before written requests reached the company's programmers. Winnebago truly attempts to add the enhancements requested by users.

The CIRC/CAT program requires an IBM/IBM compatible MS/DOS computer with a hard disk drive, a printer capable of printing bar code labels, and DOS version 2.0 or above. A DOS version of 3.1 or above is necessary for networking within the system.

The program is password protected, with the user having the option of changing the password as needed. The documentation provides a tutorial to assist new users in becoming familiar with the program and to "set up" files for the data base. It is menu driven and "user friendly," as is the program itself.

Installation is easily accomplished, even for those of us who are not terribly "computer literate." Once CIRC/CAT is installed on the hard disk, floppies are used only for back-up and for inventory. There is an input module which can be used with floppies for entering data. This is most helpful if the user has access to multiple computers, enabling entry by more than one person at once.

Books and users are assigned identification numbers as they are entered into the data base. These numbers are translated into bar codes which are read with a light wand (or may be entered easily from the keyboard) when checking books in/out or reserving them. An indexed data base is formed as data is entered, making it unnecessary to sort material or user records before printing sorted lists in several formats. A "Key Word" setup has recently been added to the program so that searches may be made by key words as well as by author, title, and subject.

CIRC/CAT performs most of the usual tasks performed by computerized circulation/catalog programs such as overdue lists, sorted materials lists, student lists, reserve lists, fine computation, recording and listing, searching by author, title, and subject., etc. In addition it provides the capability of transforming data into "Micro Library Information Format" for transfer to another location or another system, or of using data in that format for entry. Many vendors are now providing this type of processing with their books, along with prepared bar code labels. This will be most helpful for librarians ordering new materials. Records may be stored with full "MARC" format or with only the basic Winnebago CIRC/CAT record, at the librarian's discretion.

Data may be entered from the keyboard or "batch" from floppy disks. "Batch" deletions and editing are also possible when it is possible to set parameters identifying the fields to be edited.

Inventory is now accomplished by reading bar code numbers onto a floppy disk and comparing those numbers with the existing data base. In the near future, it will be possible to use the hand-held "Time Wand" to read the bar codes.

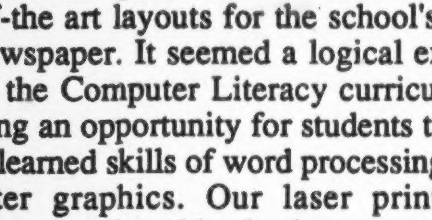
Over all, this seems to be a very good program for the money involved.

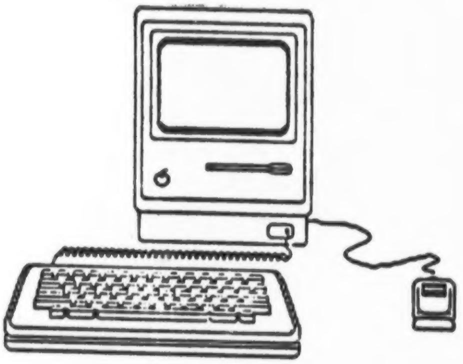
Desktop Publishing: A Dozen Dazzling Educational Uses

Well into our second year of using desktop publishing, using slides and a wide variety of "sample" handouts, we would like to share tips and suggestions regarding application of this professional looking method to the publication of various educational documents.

In our middle schools, we initially requested "desktop publishing" software and a Macintosh computer so that we could do state-of-the art layouts for the school's student newspaper. It seemed a logical extension of the Computer Literacy curriculum, providing an opportunity for students to apply the learned skills of word processing and computer graphics. Our laser printouts were done at a franchise business specializing in Macintosh/LaserWriter printing (*Alpha Graphics*). That was (and still can be) a low budget solution to obtaining laser printouts without making the commitment of buying a LaserWriter.

After school administrators saw the high quality, professional look of our laser-printed publications, they became more open-minded about approving the necessary funds for a school-owned laser printer and additional Macintoshes. We produced a wide variety of documents to convince them how advantageous it would be to have our own laser printer (housed in the computer lab, of course).





In addition to the main function of printing the master copies of the student newspaper, we now use our desktop publishing capabilities to create invitations, PTA newsletters, weekly bulletins, transparencies, slide titles, certificates, invitations, play programs, booklets, syllabi, curriculum guides, etc. Desktop publishing communicates a professional, state-of-the-art image.

Desktop Publishing Trends: Easier and Better

by Roberts A. Braden

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abstract

Desktop publishing is getting both easier and better. Costs are coming down. Quality of output is going up. The set of variables that are having the greatest impact on acceptance of desktop publishing are those which affect ease of use. The ease is increasing with which a system can be put together with everything installed up and running. In particular it is becoming easier to assemble and place in service a desktop publishing system working with MS-DOS, but Macintosh-based systems were easier to use at the outset Keys to improvement have been the development of near-standards which have supportee component compatibility, and more versatile software that will run in a Macintosh-like environment with icons and pull down menues. Tutorials and better documentation are making it easier to learn to use desktop publishing systems. New desktop application programs are becoming more powerful and making more things possible. The emergence of integrated software is the latest development of the trend toward easier and better desktop publishing.

Three variables have dominated the utility and ultimately the acceptance of desktop publishing. To wit: cost, quality of output, and ease of use.

COST

The cost variable can be dispensed with quickly. Cost is coming down, but those who could afford DTP last year are essentially the only ones who can afford it this year. Until the price of a complete DTP workstation comes down another 50% or more, very few individuals will find the price attractive for a personal purchase, and few school administrators will be likely to opt for placing a DTP system in every classroom. A related cost, that of a page description language, is unduly inflated, so a price break could come at any time, but don't count upon that sort of consumer good fortune.

QUALITY

The quality variable is also easily dispatched. The initial attraction of DTP was linked to very acceptable print quality. Although laser printed text at 300 dots per inch (dpi) is a far cry from the standards of the printing industry, it looks good enough to use as final copy for all but the most demanding applications. Since the first laser printers appeared there have been some minor improvements, e.g., more memory for preparation of better looking pages and blacker solid black output. With the affordable 400 dpi printer and the color laser printer just around the corner, more improvements are coming.

EASE OF USE

The third acceptance variable, the ease of using a DTP system, is itself a function of several subordinate variables. The first to be encountered are the factors which affect the ease-difficulty of getting started. Three key variables fall into this category:

1. *The ease-difficulty of assembling everything that is needed to get started...* While it might seem that this ought to be a non-variable because it should be easy to do, reality does not provide such a simple scenario. One reason is that unless you are buying a turnkey system - set up and running - salespeople may or may not know or wish to tell you that another major purchase is required to "make it all work." For example, an EGA monitor requires a special graphics card which is not the same as any of the ones required for B&W, CGA or VGA monitors. Or, a new laser printer may be useless without software containing a compatible printer driver.

2. *The ease-difficulty of setting up the equipment, assuming that everything has been assembled that is needed...* The lament about poor documentation is not restricted to software. Assembly instructions written in Taipei, Hong Kong or Tokyo can be confusing because they suffer

in translation. Instructions written by technocrats in engineerese can just be confusing. Computer jargon doesn't help anyone except computer people. A person who merely wants to prepare newsletters would surely be lost wondering such things as what is the difference between LPT1 and COM-1, what does a centronics fitting look like, how do you know if your mouse is parallel or serial, and where are those DIP switches and SCSI ports?

Until now there have been really only two ways to go. First there has been the Macintosh solution - everything needed originated with one supplier, and everything has been compatible. The documentation has been minimally confusing, and Apple dealers usually have been willing to send a field representative to set up new systems for purchasers. The other route has been the MS-DOS way - a mix and match exercise in which several manufacturers' products have been assembled and compatibility has always been a serious problem (sometimes solved, sometimes not.) To categorize the mix and match process as merely difficult would be to mislead by understatement. Words like frustrating, infuriating, devilish, and worse must be used to describe the process.

3. *The ease-difficulty of setting up the software so that it works with the equipment and so that it works with other software in the system...* Assuming that the software is not copy protected, even an amateur has a chance today. Such was not always the case, and with some software it still isn't. Impatience and poor documentation are the major obstacles to easy installation of any *single* software package. There is hope for documentation, however. For most products, even if software version 2 is bigger and more complex, the new documentation makes it easier to install than version 1. For the impatient, more and more intuitive menu driven installation routines are around to save those who can't be bothered to read the manual.

Learning to Use DTP

After everything is in place and working together, the first on-going utilization variable is the ease-difficulty of learning to do things with the system. Because convenient equipment options have become so widely accepted that we tend to think of them as standard DTP paraphernalia, learning DTP is easier than ever, i.e., programmable function keys on the keyboard, a mouse pointing device, multiple storage devices, high resolution screens, and fast, powerful microcomputer processor chips make equipment operation a snap. That is why the secret to ease of use has increasingly become linked to the software.

With frequent software improvements appearing as upgrades, add-ons, and wholly new products, DTP theoretically becomes easier by the day. Yet we are aware that few if any users will have the time, wisdom, or money to assemble a collection of do-everything, best-of-everything software. One reason is that not all of the good stuff works well together. A basic choice must be made concerning the hardware-software interface. The choice is based upon whether you can afford to have a PostScript-capable system.

PostScript is the expensive but extremely versatile page description language (PDL) from Adobe Systems that runs in the printer. (A PostScript-capable printer contains its own microprocessor and memory separate from the workstation microcomputer.) Other page description languages exist, but PostScript controls enough of the market to be considered the standard. The PDLl-or-no-PDL decision is critical because (among other things) it determines the availability of print fonts and how they will be formed for printing. Many of the easy and nice things that have always been possible using the Macintosh with the Apple LaserWriter printer may be attributed to the fact that the LaserWriter is a PostScript-capable printer. The Mac's shell with its ubiquitous icons is the other half of the easy-to-use recipe.

In fact, the Mac + PostScript combination is the standard by which all things on the DTP easy-difficult scale are measured. The irony of that fact is that the virtues of the Macintosh-based system are more responsible than anything for the blossoming of the DTP industry, yet the Hewlett-Packard Laser Jet (and its descendants) has been by far the best selling laser printer. The Laser Jet family is not PostScript-capable, its setup documentation has traditionally been awful, and the command language for controlling it is complex, complicated, confusing, and also poorly documented. Why then has it been so popular? The answer is simple: low cost. Further, the H-P Laser Jet has become the unquestioned standard for MS-DOS applications. In effect for three years there have been two competing DTP approaches, and in the competition between H-P and Mac the Mac has been a runaway winner in every regard except sales.

What else has happened during those three years? The Mac-based approach has gotten slightly easier, slightly better with more memory available and with better software to supplement the MacDraw, MacPaint, MacWrite genre of programs. The H-P-based approach has gotten much easier, much better with Mac-like shells (Windows or Gem), page makeup software, downloadable fonts, more memory, emerging (but still fuzzy) standards that help with compatibility, and on and on.

For both Mac and MS-DOS systems tutorials have made things much easier to learn. Books about DTP and DTP software are now readily available, as are vieotapes and other learning aids to supplement the tutorials and so-so documentation.

In addition, the overall utility of DTP has been increased with a virtual flood of new application programs. Additional power is being placed in the hands of the DTP user, providing an ever-increasing list of capabilities and possibilities. The expanded ability to present attractive graphics and other visual material is a reality made possible by recently evolved hardware-software combinations.

For even easier operation, integrated software packages are the next evolutionary step. Products are already on the market that combine graphics, word processing, and page makeup. The trend continues. Desktop publishing will be better next year, maybe more affordable, and certainly easier to set up, learn and do.

FOCUS ACTIVITIES FOR COMPUTER EDUCATION

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The implementation of focus activities that are designed to easily get the students on task and keep them there is the rational for this presentation.

Focus activities have been implemented in Willis Independent School District through "Teaching for Student Mastery." There are three main objectives of the focus section in the Mastery Model. These sections are:

A. Mental Set - Direct student attention to the objective of the lesson.
B. Rationale - Establish reasons for accomplishing the objective.
C. Objective - The planned outcome of the lesson.

When this plan was begun, I had no difficulty with rational and objective, however, mental set was more difficult. Therefore, I had to search for different focus activities for each day.

I could not go out and buy these focus activities because of the state of our economy and our school budget. This forced me to invent imaginative and low cost materials.

My search led me first to our local computer store. I established a good relationship with the owner and employees of the store. I spoke to him about my dilemma and he began donating colorful posters and magazines to my classroom.

These posters and magazines are excellent sources used to spark the student's attention. Several times I have used the posters to point out a particular concept that I would be talking about that day. I have used the magazines for reading assignments, finding an advertisement to demonstrate a particular piece of equipment and it's price.

Students and parents became another successful source for focus activities. Both began to collect cartoons and newspaper and magazine articles. I also recognize that student who brings the focus activity that I use that day.

I also keep a screw driver set in my desk drawer. I have found this to be an effective attention getter. Most of my students have not seen the inside of a computer or items that contain computer chips. I usually take these items apart in the classroom and pass them around.

These are just some of the sources of activities that I use in the classroom for focus. You too can develop these focus activities for little or no money.

Gradebook III

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One of the most useful computer tools for teachers in the field today is the electronic gradebook. Gradebook III is one of the easiest to use of those on the market today. Once the process has been refined, each teacher should find this an invaluable tool.

Gradebook III is produced by Schoolhouse Software in Denton and has a manual that explains what each part of the software does. There is some additional knowledge and some refinements that will help the first time user or redefine the process for the experienced user.

Some decisions need to be made before a teacher begins to use this piece of software. These include:

1. Percentage that the teacher wants each category to be worth. For instance, if the decision was made to have the categories of homework, classwork and tests, the categories could be assigned the following percentages: homework - 10%, classwork -50%, and tests - 40%.
2. Students can either be identified by name or ID number. If the grades were going to be posted, ID numbers would probably be a better choice.

Once these decisions have been made, the teacher needs to have the following items:

1. a blank disk
2. a list of the students (does not have to be in any certain order)

The following steps need to be completed:

1. Load Gradebook III.
2. Create a data disk.
3. Create the first period (or category), i.e., Reading, and assign categories.
4. Enter roll in the order the teacher wants the students or the computer will give the user the opportunity to alphabetize the roll.
5. Follow steps 3 and 4 for each period or category. Once the first roll has been entered the computer will copy that roll to the next period if rolls are identical.

At this point, the teacher is ready to begin entering grades. When entering grades, decisions must be made about assignment names and categories. The more specific the assignment name the more meaningful the reports the user prints out will be. Each time the user enters grades a printout should be made of the grades in gradebook format and a list of assignments. If both of these printouts are made and either the disk becomes unusable or unaccessible, grades will still be available in paper copy.

Reports available include:

1. Parent reports with all assignments and grades and method of obtaining the average.
2. Grades in gradebook format.
3. Failing students reports.
4. Missing assignments lists.

At the end of the six weeks, the data disk is backed up and all grades and assignment information deleted from the copy leaving the teacher with rolls and category information intact. The old data disk should be stored.

How to Set Up and Run a Computer Club

Carol Utay, M.Ed., Computer Lab Director

Don Jones, M.Ed., Computer Lab Coordinator

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This presentation offers the "nuts and bolts" ways for students to receive an extraordinary computer experience. Some advantages are: 1) opportunity for extra computer time; 2) opportunity to assist a teacher through the "Adopt a Teacher" program and 3) introduce the computer lab to parents and other members of the community.

Proposal for Computers/Learning Disabilities and Reading Convention

A computer club as an activity creates potential benefits for both the learning different student and the mainstream student.

The benefits of such a program are many. The only limit is the student's willingness to take advantage of the opportunities offered. Principal foreseeable benefits include:

1. The learning different student is able to succeed in an environment unrelated to his challenge areas, thus giving him/her confidence in his/her abilities and demonstrating these abilities to his peers.

2. The club is an excellent tool for structuring the student's study time and by utilizing this structure, giving him/her additional computer time for extra projects.

3. Increased teacher and community computer competence will result due to two facets of the club's makeup. First is the "Adopt a Teacher" program. In this program, the student and teacher contract to utilize the computer in the classroom. Projects to benefit the class are unlimited, but can include class banners, letterhead, cross-word puzzles, etc..

4. In addition, each club member has the responsibility of training a parent volunteer in the fundamental aspects of a computer system. The student with his new-found knowledge can teach such alien concepts as "disk drive", "modem", "software", etc. seem more realistic.

Students who have the advantage of home computers have the opportunity to use these new found skills at home. This has the potential to channel free-time at home into useful academic pursuit.

In the computer club, the advisor has an opportunity to deviate from the normal curriculum. This way, both teacher and student can explore and experiment. This could be an important way to supplement the day-to-day curriculum.

IMPLEMENTING A DESKTOP PUBLISHING SYSTEM

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Implementing a desktop publishing system is not an easy task. Several decisions need to be made before the system can even be purchased. First a need has to be established. Next a budget is decided upon. Software selection is completed and finally the hardware is selected. Desktop publishing in an educational setting can be a very valuable tool. It can save the district money, improve the looks of any document going out of the district, and it gives the district control over the amount of time it takes to complete a project. Desktop publishing is an exciting process that everyone will want to try.

Desktop publishing has become the "catch phrase" of the 1980's. While the term itself does not have any real meaning, perhaps the best term for the process is "page processing."

The traditional publishing process takes a long period of time and is very costly. The document is written, sent to the editor for revisions, and then taken to a typesetter for retyping. Art and/or graphics are added and merged with the text on a layout sheet. Finally, it goes to the printer.

In desktop publishing (DTP), the same person may originate the document, edit it, add graphics, and print it. The entire process takes less time and money. More importantly, the originator has control over the entire process. DTP makes printed material look better. This is one of the main reasons for using a DTP system.

Everyone who has put words, pictures, charts or graphs onto a piece of paper has participated in the DTP process. Desktop publishing is the merging of these elements.

Deciding on a DTP system is like deciding on the weather. It is very difficult to know what to buy. In the area of DTP, just as with the weather, changes are constantly occuring. Actually, there are no set rules on how to make the decisions necessary to assemble a DTP system.

The number one decision is to find out if there is a need for desktop publishing. In fact, "need" is considered the golden rule of making any computer decisions. After need is established, the amount of money in the budget needs to be considered. This amount will limit or enhance decisions made on hardware and software.

What software is needed is the next decision that needs to be made. There are three major types of software that are necessities for DTP: Word processing, graphics, and page processing. Other software packages may be added later, they may include: font choices, spelling and grammar checkers, clip art packages, and text or graphics conversion programs.

The hardware decisions are now made. Hardware consists of a computer, monitor, printer, and if possible, a scanner.

There are two main choices of basic computer systems--IBM and the Macintosh. Personal preference is the main deciding factor between them. Whatever equipment is selected it should meet the specifications of the software--memory, hard disk drive, or graphics card. If an IBM is already available, then it may be possible to upgrade the system rather than switching to another system.

The Macintosh has a closed architecture--all of the components are attached. The IBM, however, has open architecture. Therefore, many more decisions need to be made. Deciding on the right display monitor is very important and is a difficult decision to make because there is not a single standard display unit. Some of the characteristics to be considered are: Color or monochrome, CGA, EGA, large screen, speed, and resolution.

The laser printer is credited with giving DTP documents the look of a typeset document at about a tenth of the cost of a document produced with the traditional typesetting equipment. Although a laser is not essentail, it is to have a quality product.

Scanners are not a necessity but are very useful tools. They are used to extend the options available with graphics. They are used to enter pictures, images, and other information.

It is very important to make sure that the system selected will do what it needs to do. That the componentns will work together and that they will perform realiably under a variety of conditions. Before the decision is finalized, it is important to: read the current literature, consult with those who are actually doing desktop publishing, and try out the hardware and software selected before buying it.

Desktop publishing provides a cost-effective solution to the document creation process for businesses, schools, and colleges of all sizes. Tasks that once required the services of outside typesetters are now performed in-house with a considerable savings of both time and money. This savings may justify the purpose of purchasing the desktop publishing system.

Involving Teachers with Computers

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In order for a computer program to be successful at any level teachers need to be involved before the students will be successful and enthusiastic about computers. At the earliest points, the use of software can be successful in involving teachers.

The State of Texas has recognized the need for its studenst to be computer literate by requiring of these students a semester of computer literacy at the junior high level and a year of some phase of computer in the high school years. In addition, pre-service teachers are taking a computer literacy course as part of their teacher education courses. In spite of all of these populations being trained, there is still a segment of the population being ignored. That is the teachers who are already in service. Particularly at the elementary level, the success of a computer program depends on the involvement and enhusiasm of these teachers.

Several approaches could be taken to involving and training these teachers. Training could be offered through a graduate course at the university level or an undergraduate course at the community college. Another approach would be that school districts could offer a course for career ladder credit or as staff development credit. The problem with any of these approaches is that training is no good unless it is put into practice.

A more productive approach might be to have a person on the faculty trained in the use of computers and enthusiastic enough to inspire other teachers to attempt implementing computers into their curriculum. It is unlikely that a person will ever be funded by a school district to work strictly with the implementation of computer use at all levels in an individual school, but conceivably a stipend might be provided for a person to do this as an extra duty. Training could be done during planning periods and after school. Teachers completing the training satisfactorily could be eligible for career ladder credit.

Suitable software can go far in pulling teachers into using their computers after training has been offered. Some pieces that are suitable for teachers at all levels include the following:

1. Word processors
    a. Appleworks - an integrated piece for Apple IIE, IIC, and IIGS.
    b. Paperclip Professional for Commodore.
    c. PFS Write or Bank Street Writer Plus for IBM, clones or compatibles.
2. Electronic Gradebooks
    a. Gradebook III for Apple and Commodore.
    b. Grade Calc for Apple and Commodore.
    c. Classmate for Apple, IBM and Commodore.
3. Graphics
    a. Printshop for Apple, IBM and Commodore.
    b. Graphics libraries to accompany Printshop.
    c. Drawing software for the Apple IIGS such as Top Draw and Deluxe Paint II.
4. Teachers Tools
    a. Crossword Magic for Apple, IBM and Commodore.
    b. Hi-Tech Teacher Tool Kit includes word search, word scramble, word match and multiple choice formats for Apple and IBM.

The teacher trainer needs to be willing and able to help teachers implement these pieces of software.

KIDS - COMPUTERS - CURRICULUM
Implementing a Summer Computer Program or Computer Club for Students in Grades 4 through 7

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The presentation of this issue will focus on the implementation of a supplemental summer computer camp program. Both administrative and instructional content concerns will be discussed. A slide presentation will be shown as well as final products of camp students and curriculum documents.

Many school districts desire to enhance their instructional technology course offerings but face equipment and funding constraints during the regular school year. A summer self-supporting computer camp program may be the answer! Fort Bend I.S.D. started implementation of such a program four years ago. At that time, three camp curricula were available to students entering the 4th and/or 5th grade. This upcoming year, five camp curricula are planned for students entering the 4th through 7th grade. The program continues to grow and shows all aspects of success! The remainder of this paper outlines specific details for this summer program implementation.

CAMP CURRICULUM AND STUDENT ELIGIBILITY

All computer camp curricula have been developed to include technology-based objectives in addition to English language arts and mathematics objectives. A carefully planned sequence of computer activities are planned in each camp that enhance, but do not interfere with, the instructional computer program that occurs during the regular school year. Each camp session is ten days in length; four hours per day.

Computer Camp 1: (Students entering grades 4 or 5 who have not attended Fort Bend I.S.D. Computer Camps previously) Students will solve problems using the text-writing application, generate graphics using canned utilities, and develop a camp newsletter.

Computer Camp 2: (Students entering grades 4 or 5 who have completed Computer Camp 1) Students will create still and simple animated low resolution graphic designs using the BASIC programming language.

Computer Camp 3: (Students entering grades 4 or 5 who have completed Computer Camp 2) Students will produce projects using an intermediate level of animated graphics created in the BASIC programming language.

Computer Camp 4: (Students entering grade 6) Through the use of super-procedures in Logo, students will solve complex turtle graphics problems.

Computer Camp 5: (Students entering grade 7) Students will use Logowriter to integrate graphics and textual documents.

A "Parents' Hour" is offered on the last day of camp. Parents are invited to see the projects execute on the computer (taking advantage of animation, color, and graphics), visit other camp sessions, and talk to the teachers.

ADMINISTRATIVE ISSUES

In the past, the computer camp program operated for six weeks (three registration periods) during the summer. Because of the time necessary to reinstall equipment borrowed from other campuses for camp use, the 1988 program will operate for four weeks (two registration periods). The camp site is at the location where other summer instructional programs take place. Camp tuition is $80/in-district student/10-day session. The teacher/student ratio is kept at a maximum of 1 to 12. Hardware/student ratio is 1 computer to 1 student; 1 printer to 2 students.

The camp program is staffed by District teachers who have been selected based on past performance and through an interview process. A lead camp instructor is hired to act as a "team leader" or "department head". These teachers report to the summer program's building principal for issues dealing with student discipline and teacher duties. Camp content issues are channeled from the lead camp instructor to the District's Instructional Computing Department. One day of inservice is provided prior to the beginning of the camp sessions.

CAMP EVALUATION

Fort Bend I.S.D. requests that each parent, student, and instructor involved in the camp program complete a special camp evaluation form. Any concerns voiced on the forms are evaluated and considered for the following year's sessions.

In closing, the summer computer camp program must remain on a strict time line because of equipment transfer between campuses. A great deal of hard work is completed by central administration, the teachers, and the students. But, it is all very worthwhile when you see students motivated and happy as they apply basic skills and create a wonderful summer project! Parents are proud; teachers are proud, and most important, students are proud!

Make Appleworks Zing!

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Computer Literacy Teacher
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Abstract

Appleworks™ is an integrated software package offering word processing, spreadsheet, and data base applications. Its ease of use has made it one of the most popular programs for homes and schools. However, some intermediate to advanced features of Appleworks go unused. In addition, several third party software developers offer a variety of add-ons and extensions to Appleworks. This presentation is a demonstration of some of the advanced features and extra products for Appleworks.

Make Appleworks Zing!

Appleworks™ is an integrated software package offering word processing, spreadsheet, and data base applications. The integrated aspect makes it particularly appealing to new computer users. They only have to learn one set of commands rather than three. After working with one application, the procedures transfer easily to the next application. Also, the integrated nature of the program allows transfer of information between the applications.

The ease of use, however, can mask some of the more advanced aspects of the software. In Appleworks 2.0, merging of data base information into letters and forms has been included. This feature can be used for mailing and for creating and filling out forms. The many print options of Appleworks also allow much flexibility in printing. Different sizes of characters, adjustment of margins, centering of text, and spacing are a few of the simple possibilities. In the data base, different print formats and screen formats which can be created make the data base information more useable. The spreadsheet also has advanced feature which allow the spreadsheet to be used in a number of interesting ways.

A number of third-party software developers have also created programs which extend and enhance Appleworks. These include programs for desk-top accessories such as calendars and calculators which operate while Appleworks is being used. A number of spelling checkers and grammar checkers have also been developed for use with Appleworks. Another add-on program creates graphs and charts using the

Appleworks spreadsheet data. Other software has been created as spreadsheet templates for particular tasks including keeping sports statistics.

The advanced features and add-on programs which make Appleworks zing will be demonstrated in this presentation. It will include specific instructions for using the Appleworks and software which enhances Appleworks.

Appleworks Resources

Books

John Campbell and Sam Redden. Working with Appleworks. Hayden.
Charles Rubin. Command Performance Appleworks. Microsoft.
Robert Ericson. AppleWorks Tips and Techniques. Sybex.
Mary and David Campbell. Extending Appleworks. McGraw-Hill.
Arthur and Elaine Aron. Using Appleworks. QUE.
May Lien Ho. Appleworks for School Librarians. Hi Willow Research & Publishing, Fayetteville, ARK.
Carole Matthews. Appleworks Made Easy. Osborne-McGraw-Hill.
Dean Clayton and OK D. Park. Appleworks: Integrated Applications for Microcomputers. South-Western Publishing Co.
Close, Kenneth. Appleworks with Advanced Applications: Calc, File, Write & Graph. William C. Brown Publishers.
Linda Rathje. Appleworks for Educators-- A Beginners Workbook. ICCE.

Add-ons, Templates, and Accessories

Pinpoint. Pinpoint Publishing, Box 13323, Oakland CA 94661
Desk accessories for Appleworks.
Schoolworks. K-12 Micromedia. 6 Arrow Road, Ramsay, NJ 07446.
Three sets of templates: Teacher, Office, Athletic Director.
Macroworks. Beagle Bros, 3990 Old Town Avenue, San Diego CA 92110.
Macros and many extra built-ins to enhance AW.
Sensible Software. 210 S. Woodward, Suite 229, Birminham, MI 48011
Sensible Speller. Sensible Grammar.
GraphWorks. PBI Software. 1155B-H Chess Dr., Foster City, CA 94404
Sideways. Funk Software, Inc., 222 Third Street, Cambridge, MA 02142
Sportsworks. MECC. 3490 Lexington Ave North., Saint Paul, MN 55126

User Group and Information

The Appleworks Users Group (TAWUG). PO Box 24869. Denver CO 80224-0869
Apple Education News. 20525 Mariani Avenue. Cupertino CA 95014

MAKING THE BEST LOOK THAT WAY

PRESENTED BY JOHN CUTSINGER, WESTLAKE HIGH SCHOOL, AUSTIN, TX 78746

From the high school newspaper and yearbook to the day's handout, overhead, or weekly test, students can give publications and teachers can give documents a *stand out in the crowd* image when prepared with the assistance of a desktop publishing system. Use the Macintosh for functional, good looking presentations.

When my journalism students first suggested that we consider desktop publishing as a way to reduce production costs and as a way to have more control over our publications, I emphatically said "no."

My insecurity in the capabilities of the system was only outdistanced by my insecurity in my ability to deal with the system. Both of those inadequacies were quickly overcome with an abrupt introduction into the daily routines of desktop publishing.

Our system of two Macintosh Pluses and a Laserwriter were delivered the first of September and by the first of October, the newspaper staff had published its first issue of the newspaper.

Using Microsoft Word, the staff initially used the desktop system only for typesetting. By the third issue, editors had begun using Pagemaker to complete design work.

However, I still used MacWrite and the desktop publishing system as a glorified typewriter.

The first step in effectively using the desktop publishing system lies in the user's ability to overcome the fear of computers. Secondly, one must recognize the unlimited potential of the system and its capacity as a typesetting and graphic design instrument.

Just because one knows how to use the Macintosh or any other desktop system doesn't mean that the result will be beautifully designed and graphic documents. The third step to visually exciting publications lies in the understanding of both the system and basic design guidelines. To prepare visually appealing overheads, handouts, and examinations takes the same skills as those which student journalists practice to publish nationally acclaimed newspapers and yearbooks.

As my newspaper staff realized the potential of the desktop system, the yearbook staff followed suit. Soon, I began to realize there was something in it for me, but the availability of the terminals was limited with two staffs using the system. We expanded to four Mac-Pluses adding a hard disk drive to facilitate the efficiency of the system.

The added Macs gave the yearbook and newspaper staffs more computer time

MAKING THE BEST LOOK THAT WAY

PRESENTED BY JOHN CUTSINGER, WESTLAKE HIGH SCHOOL, AUSTIN, TX 78746

and me some computer time before and after school when staff members weren't in line.

I found myself creating a host of visually appealing instructional materials. Handouts became a challenge rather than a dreaded necessity for me as well as for my students. Not only were the handouts creatively designed, but they also took on a stronger concept as the ability to revise and polish was much easier.

The documents afforded me the opportunity to put into practice the very design and graphic skills that I was teaching my students. And it's those basic techniques that can make your work the best and make the best look that way.

It's true that desktop publishing will not ensure great-looking publications or documents. It takes knowledge, expertise, and experience to create visually attractive pieces. For those who don't really care what their work looks like, the desktop system still has that financial advantage in that you can create poor publications more cheaply.

But for those who do want the best, desktop publishing opens up a world of possibilities not financially possible before on a scholastic level. The desktop system can be used to prepare camera-ready work for the photocopier or printer.

For most work, we use four basic programs which yield tremendous potential for both typesetting and graphic design:

Microsoft Word
Pagemaker
Cricket Draw
SuperPaint

However, the real key to successful publications and documents lies in the mastery of the desktop system and software programs as well as the consistent application of the basic design and graphic guidelines noted below.

To design most effectively requires only special attention to a given set of rules which will allow the layout of elements to best serve the informational needs of readers. The following guidelines should assist you in the design of entire publications as well as single documents.

☐ Each page/spread has a center of visual impact or a dominant element that captures the attentionof readers and encourages them to consider content. This element might be a photograph, artwork/illustration, or type.

☐ Design shows simplicity with single story presentations and related packaged material creating solid rectangular units or modules.

☐ Content has been evaluated for importance and has been placed accordingly with the most important information at the top of the page/spread and secondary material graduated from top to bottom.

☐ Outside margins and inner spacing between elements have been consistently established and maintained to create a planned look.

☐ A basic column structure has been established which encourages readers to consider material. Copy the width of a full page has been avoided.

☐ Headlines (larger type of 14 points or more) have been used to reflect not only the content of the material, but also the importance of the story in design, size, and density.

☐ Typeheaviness has been avoided to encourage readership throughout the document or publication.

☐ Graphics have been used which enhance content rather than distract readers.

MIDI: Technology for Creative Music Education

Dr. David Sebald

Corpus Christi State University

MIDI is a computer-related technology which has dramatically changed the way music is being made in the United States. Properly used, it can also be a major benefit to music education. This presentation explains the basic concepts of MIDI, demonstrates what MIDI software and hardware can do, and suggests potential applications in arts education.

The acronym MIDI stands for musical instrument digital interface. It represents an attempt by electronic musical instrument manufacturers to adopt a standard set of specifications through which their instruments can communicate with each other and with computers.

Basically MIDI is a system for recording or transmitting musical performance information. Traditional methods of recording or transmitting music merely transform sound waves of an actual performance into another form. MIDI, however, communicates generalized performance information like what note is being played, how loud it is, what kind of sound it is, which electronic instrument should play it, how is the pitch being bent. A verbalized example might be, "Synthesizer on channel one, turn on a note. The note is C5. Attack it mezzo-forte."

MIDI tools can be conveniently divided into hardware and software categories. Common hardware consists of input devices, (keyboards, pitch wheels, foot pedals), sound generators (synthesizers or synth modules), and sequencing hardware (often a micro-computer). Common software consists of sequencing programs, which allow the storage and manipulation of MIDI data, and voice librarians/editors, which allow the musician to produce unique, personalized timbres in his compositions.

Although MIDI has proven its effectiveness as a musical tool in commercial music it has not yet made much impact in a very conservative music education profession. This is unfortunate as its application would make feasible the teaching of many aspects of music to which the profession has heretofore only given lip service. MIDI shows great potential in the following areas: 1) Allowing students to interact with an entire work of art rather than just one part as in the typical band or choir, 2) Assisting technique so that students don't have to filter musical expressivity through undeveloped physical dexterity, 3) Encouraging study of other peoples' music in depth, 4) 4) Exploring new forms of musical art, 5) Staying current with the children perceive as "real music," and 6) Helping students develop ability in performance.

Caveats exist concerning its use in music education, but MIDI is far more than a fad and can prove to be a major benefit to the profession.

MIDI: Technology for Creative Music Education

A Pilot Project using MIDI in the Corpus Christi Public Schools

Dr. David Sebald

Corpus Christi State University

This presentation addresses several strong beliefs the author holds concerning contemporary music education and reports on a pilot project he conducted to apply them in the field.

The most pressing need for music education in the current educational climate is to adopt an educationally justifiable rationale for its existence. A basis for an acceptable philosophical framework exists, but it requires the profession to organize its teaching around the aesthitic experience and the individual. Music learning must be balanced among abilities to understand, appreciate, communicate, and create musical art.

Current music education programs generally fall far short of these requirements. For example they are traditionally too heavily performance oriented, too totalitarian, and too resistant to modification.

During the fall of 1986, the author conducted a project in the public schools of Corpus Christi to test the viability of several new ideas which he felt would come closer to true music education. Ten students with no prior formal training in music were exposed to musical elements and musical exploration with the assistance of computers and MIDI synthesizers. They studied and interacted with such musical concepts as form, harmony, melody, timbre, and rhythm. As a class project, students contributed individual musical ideas to a sequencer and then collectively decided on the overall shape these ideas would take in a composition.

The results of the study indicated both musical learning and very favorable affective response.

Networking: A District-Wide Plan

Bill Adkins
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Plano, TX 75074

Plano ISD is committed to tying its computers together electronically via networking. The session will discuss the plans for integrating CAI, grade reporting, and testing into one communications network of student computers, teacher computers, school computers, and district computers. Both, current status and future plans will be discussed.

Plano ISD has committed to a networking strategy for computer utilization in both the instructional and administrative applications. There are forty-five networked instructional labs consisting of a server and thirty student stations. In addition, there are over 2,500 additional computers being used in a stand-alone mode. A large computer system has been installed at the central office. The process of writing and implementing various administrative functions is under development. The long-range plan calls for machines throughout the district to be tied together electronically. This session will emphasize the instructional uses of networking for both student and teacher use. The core of the instructional computing program consists of CAI, grade reporting, and testing.

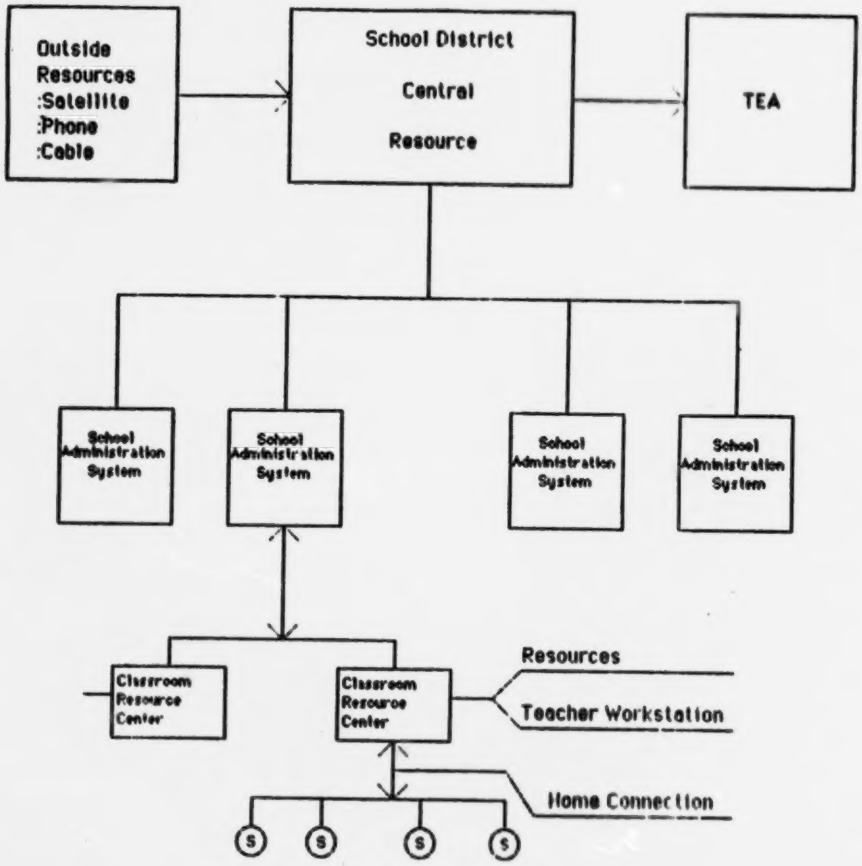
Students use computers for computer assisted instruction, computer augmented instruction, computer literacy, and as tools. Some of these applications are most effectively used in a stand-alone mode; but some lend themselves to networking. When computers are used to deliver instruction, provide drill and practice, or communicate to each other, networking is practical. Ideally, good courseware will be presented, exercises delivered to the student, responses analyzed and recorded--all without teacher intervention. To reach this goal, courseware and a good instructional management system will have to be integrated.

A second core element is an electronic gradebook program that will have the ability to import and export data. It must be capable of interfacing with both the CAI component and the testing component. Teachers must be able to record homework, classwork, tests, observations, etc.

The gradebook must be flexible enough for each teacher; yet have the capability to meet district standards.

The third component is the testing module which consists of a test scoring, test results, and item bank. Teachers need access to this application to conserve time. The testing component must feed directly into the gradebook so teachers will not have to keep two sets of records.

To meet the goals of the district and to interface the three components, networking is the key. Networking provides the ability for two-way communication (student/teacher, teacher/principal, teacher/counselor, classroom/office, school/district). The district plan for this communication network can best be summarized by the following model.


Outside Resources :Satellite :Phone :Cable
School District Central Resource
TEA
School Administration System
School Administration System
School Administration System
School Administration System
Classroom Resource Center
Classroom Resource Center
Resources
Teacher Workstation
Home Connection
S
S
S
S

NETWORKING - A TOTAL SOLUTION

Jack McDonald, Vice President
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Elementary schools are finding the computer to be a valuable tool for computer assisted instruction (CAI), computer managed instruction (CMI) and computer literacy. Networking can provide a more cost-effective and instructional efficient means of delivery. Issues of accountability and proven methods of applying objectives based instruction are discussed and demonstrated.

Computerized activities may not always be appropriately selected for elementary students because of the lack of preparation time and/or interest on the part of the classroom teacher. As a result, the time spent on computerized basic skills remediation or reinforcement is not as effective as we expect it to be. Additionally the cumbersome job of handling many floppy diskettes for the appropriate lessons, or even the availability of the appropriate diskette for each student becomes a management problem.

Finally, because the lessons are not often accompanied by written feedback according to the students' progress, the teacher does not really know if the time spent on the computer was effective.

By eliminating the need for floppy disks and providing management for all software in a consistent format, students spend more of their time in the computer lab ON-TASK. The teacher can then assign the appropriate lessons more easily and let the computer do the work of tracking through a skill sequence and recording mastery or non-mastery.

Good software for networking purposes is now available and good management systems for that software are now in the 2nd or 3rd generation of development, thereby providing better solutions for the concerns named above.

Networking with the Corvus LAN and Apple computers provides the best of both worlds in many cases. Computers can be linked together in a closed lab and/or they can be linked between classrooms. Apple has the largest existing base of excellent CAI software and has become the educational computer standard. The cost of software can be better controlled and its relation to the curriculum much increased as a result of networking.

This session will demonstrate all of these benefits and show the participants a logical solution to many types of problems in the schools. The solution is cost-effective, as you will see, and the software will be demonstrated as time allows.

NEW IDEAS FOR APPLEWORKS USERS
DEVELOPING TEACHING UNITS FOR NON-COMPUTER STUDENTS

Susan Merritt, Business Data Processing
Dimmitt ISD
Box 753
Dimmitt, Tx 79027

Teachers can use Appleworks and Autoworks to develop a unit of study for any subject area--any level that requires NO computer knowledge on the student's part. The lesson will flow as if it were a commercially published program.

Appleworks is a very versatile teacher tool. Autoworks is a program that incorporates the use of macros with Appleworks. Autoworks makes the use of Appleworks automatic.

PERKS FOR APPLEWORKS

Gloria Ware
Katy I.S.D.
6301 So. Stadium Lane
Katy, Texas 77450

AppleWorks has many applications that will enhance its use and provide the user with a variety of challenges. A custom printer can be added to allow AppleWorks to print in color. Different fonts can be created by transfering AppleWorks files to other word processing programs. The Mail Merge feature on the 2.0 version makes it easy to insert information from the data base into a document. AppleWorks can print lines of text from a data base using the labels report format. The catagory order of a data base can be redesigned and much more.

You can print text in color using AppleWorks if you have a color printer by adding a custom printer to the printer list. By changing the Boldface Begin code to start color printing (Esc K) and the Boldface End code to return to black print (Esc K0), you can print words, phrases, sentences, etc. in six different colors. When writing a document, use the Control-B command plus a one-digit color code to start printing in a color, then use the Control-B command again where you want the color to stop. Color codes are: 1=yellow, 2=red, 3=blue, 4=orange, 5=green, 6=purple. Experiment placing different colors throughout your document and add personality to your writing.

AppleWorks doesn't allow for adding special fonts to your writing like many of the other word processing programs. You can use AppleWorks files with MultiScribe by changing your AppleWorks file to an ASCII file, and then dumping the file to MultiScribe to spice up your document. You can also go from MultiScribe to AppleWorks, but you will lose the special fonts.

The print labels feature of AppleWorks is great for printing several lines of text from the data base. This feature is especially useful in writing annotated bibliographies or adding descriptions to an inventory. In the data base, you can use as many lines as you need by creating as many description catagories as you need. When printing descriptions, use the label format and justify description 2 next to description 1. Using 17 CI will allow the two description catagories to be printed in one line across the page.

There are times when you want to merge two AppleWorks data bases with similar information, but the catagories are not in the same order. Create a labels report format in the category order of the destination file and print the report to an ASCII file. Create a new data base file from the ASCII file, and you can merge using the clipboard.

Because AppleWorks is an integrated program, it is more flexible than most programs. You can transfer files between Apple Works and many other programs which allows for even more flexibility. Although AppleWorks is an easy program to learn, it can be challenging to expand its limitations and find new applications.

The 2.0 version of AppleWorks has a mail merge feature which allows you to print personalized letters. Using this feature, you can insert any information from the AppleWorks data base into a document. Print the data base to the AppleWorks Clipboard choosing Mail Merge as the destination of the data records, and then use the word processor Options command to mark each location in the document where•you want to merge an entry from the data base.

PRINT SHOP GRAPHICS & APPLEWORKS TEXT

— What a Combination!

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This session will demonstrate how to combine the use of Print Shop Graphics with Appleworks. The purpose of this session will be to:

1. discuss how to plan and layout Print Shop designs.
2. demonstrate how to combine the use of the two software packages.
3. display a variety ideas and situations where the use of the two packages is appropriate.

Participants will be given handouts for use when planning layout and designs. Public domain graphic disks will also be avaliable.

Print Shop and Appleworks are two software tools every computer user should include in their library; especially, if they plan to do inexpensive desktop publishing. Both Print Shop and Appleworks are simple enough to be used by novice or beginners. However, the combination of these two software packages are sophisticated enough to produce well designed, camera ready copy.

The key to producing quality copy is planning. Hubert, Winebrener, and Qualkenbush (1987) provide the foundation for planning quality graphic projects. Well planned layout and design can be accomplished through a series of a 8 simple steps.

Step 1: Select your graphic(s)
Step 2: Select your graphic(s) size
Choose the appropriate layout sheet for the graphic size you have selected.
Step 3: Select a font
Step 4: Place the graphic layout sheet behind the font layout sheet. Trace the boxes where you will place graphics.
Step 5: Fill in your message.

Step 6: Complete the sign/greeting card planning sheet.
Step 7: Make menu selections from Print Shop program.
Step 8: Preview your design
Step 9: Print your design.

Hubert, Winebrener, and Qualkenbush (1987) also developed a series of planning sheets and templates that make the task of planning very easy.

The incorporation of Appleworks in your design adds another three steps to this process.

Step 10: Create your Appleworks text.
Step 11: Line the printer up where you want the text to be printed.
Step 12: Print your text.

This process is easy, quick, and precise. It saves time, energy and money. But most importantly, it produces quality graphic designs ready to be copied and displayed.

A variety of graphic programs enhance the creativity of the Print Shop program. A few are described below.

Print Shop Companion, Graphic Libraries 1, 2, and 3, and the Holiday Editon are by Bouderbund Software. These packages contain graphics designed especially for use with Print Shop.

Graphic Expander is by Springboard. This package contains Newsroom type graphics for use with Print Shop.

Printer's Library / Graphic Disk including Printer's Angel, Printer's Devil, Printer's Patriot and others are by BCI Software. Each disk in this series provides over 100 graphics and insignias for use with Print Shop, Newsroom and PrintMaster. Printer's Angel contains a Convert-A-Graph program that converts graphics from Print Shop to Newsroom or PrintMaster.

Texas Grapcics by Magic Mind Software Company. This disk contains over 80 graphics related to the Lone Star State.

Public Domain Graphic Disk are available from a variety of sources. For a collection of some of these graphics bring a blank disk to the presentation.

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Print Shop Libraries, How To Get More of Them

Gerald Pollard
Texas School for the Deaf
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This presentation will show how and where to get approximately 27 commercials disks full of print shop graphics/fonts/borders and where to get approximately 30 public domain print shop graphic/fonts/borders disks. Interesting and unique applications will be demonstrated.

For those of you who enjoy using Print Shop for making cards, signs, banners, stationery, calendars, etc. you know that the more graphics, borders, and fonts to choose from the more precise you can be in delivering your intended message. Getting more of these disks can be difficult. I'm hoping to pull all known sources together, thus making it easier to know what is available and from whom. First I will describe the commercial software and then the public domain disks. (Due to space limitations only a sample of each will be presented here).

Commercial Software

Hebrew/Jewish

Davka Corporation provides Hebrew and Judaic graphics, fonts, and borders on three disks. DavkaGraphics Disk 1 provides 63 graphics of holidays, scenes of Israel, Jewish symbols and graphics for all Jewish occasions. DavkaGraphics Disk 2 provides 75 graphics of Jewish occasions. DavkaGraphics Disk 3 includes 50 new graphics, 18 dazzling borders, and 5 new professionally crafted Hebrew fonts and a list of Hebrew expressions and their English equivalents.

Steel Publishing

Steel Publishing of Concord, California has produced six graphics and two border disks. Picture Disk *1 contains 51 pictures of animals, computer equipment, science and holidays. Picture Disk *2 contains 51 pictures of foods, games, household items and symbols. Picture Disk * 3 contains 51 pictures of personalities, career jobs and body parts. Picture Disk * 4 contains 96 pictures of animals, computer hardware, sports, transportation, holidays, women and foods. Picture Disk * 5 contains 96 pictures of communication symbols, geography, school items, and holidays. Picture Disk * 6 contains pictures of sports, animals, holidays and patriotic symbols. Border Disks *1 contains 50 different and interesting borders and Border Disk *2 contains an additional 50 borders.

Public Domain Print Shop Graphics

TCEA

A new source for high quality software is our own Texas Computer Education Association (TCEA) public domain software library. TCEA Disk * 69 contains 101 Print Shop graphics, TCEA Disk *70 contains 58 graphics, and TCEA Disk *87 contains 94 graphics.

IAC

The International Apple Core (IAC) puts out a disk of the month that many Apple clubs through out the country subscribe to. IAC disk * 58 contains 36 Print Shop graphics.

BIG RED COMPUTER CLUB

The Big Red Computer Club of Norfolk, Nebraska, has 14 public domain print shop graphic disks each containing over 70 graphics each and one border/font disk.

Problem Solving and Unique Learning Environments On the Computer

William F. Kernahan
Director of Customer Support
Sunburst Communications, Inc.

Computer software can be designed to accomplish a variety of tasks — from drill-and-practice to tool applications to fastering problem solving skill development. This session will allow the participants to explore a variety of computer generated learning environments — all of which will cause a problem to be solved and a critical thinking skill to be applied.

This session will be a "mini-workshop" on using computer software to develop problem solving or critical thinking skills. The Sunburst PROBLEM SOLVING SKILLS WORKSHOP MANUAL will be used as the leader's resource.

The focus of the workshop will be to create activities that allow "the teachable moment" to occur. This "teachable moment" is defined as engaging students in novel, challenging, and motivating situations. Sunburst software, as well as that of other publishers, will be used to generate these environments.

The participants will explore software that develops MEMORY, DISCRIMINATION and STRATEGIES such as patterning, guess-and-test, working backwards, hypothesing, etc. A matrix of skills to develop will also be explored.

The session will conclude with a discussion of integration ideas, i.e., taking critical thinking skills practiced in computer environments and using them in traditional curriculum areas.

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Producing an Interactive Videodisc On a Shoestring Budget: Reflections On Our First Videodisc

by

Dr. Robert V. Price
and
Kenny Patrick
Texas Tech University

Abstract: Interactive video is one of the most dynamic instructional technologies to emerge in recent years. It is a medium capable of displaying slides, motion segments, print materials, animation, live action, color or black and white. This presentation will document the steps taken by a class at Texas Tech University to produce a videodisc from scratch.

What a videodisc is:

A videodisc is a storage medium about the size of a 33 1/3 rpm record. It is a sheet of aluminum pitted by a laser beam and sandwiched between two pieces of plastic. It can later be "read" with a laser beam and a light sensor. The pits can be packed more closely together than can the magnetic particles on a floppy disk. Because of this, a videodisc can hold the same amount of digital information as can 5,000 5 1/4 inch floppy disks.

With the ability to store and randomly retrieve 54,000 slides on each side, a videodisc represents a phenomenal repository of visual stills. The technology is not limited to slides, though. A videodisc can also store and retrieve motion segments, print materials, animated sequences, live action, color or black and white -- all at the same time. There is also room for two soundtracks.

What it can be used for:

The business world and educators are constantly finding new uses for the videodisc. It can be used as a visual library. It can be used to train employees. It can be used to enhance Computer Aided Instruction. It has even been used as a parlor game and to keep young children meaningfully occupied.

How to produce an interactive video:

With careful planning and a modest budget, producing an interactive videodisc from scratch is well within the capabilities of educators. In the spring semester of 1987, the College of Education at Texas Tech University offered a course on accomplishing such a task.

The first step is to determine whether or not the instructional goal will benefit from the use of interactive video. Because of its extreme versatility, most situations can be greatly enhanced through the use of the technology. This decision is usually made after conducting a needs assessment.

Once it has been determined that producing an interactive videodisc is a viable option, specific learning objectives should be identified. These will be used as an organizing document and provide direction for the project. It is important to be as thorough as possible at this stage in order to avoid confusion later.

Early in the project, a development team should be organized that will carry out the various sub-tasks required. Ideally, a team will consist of an author (who normally has the final say in case of disagreements), an audiovisuals specialist, a computer programmer and a documentation specialist. Of course one person could assume all of these roles or any combination of them. This is not recommended, however, because the entire task is labor intensive.

The author and team members should use the instructional objectives to develop a system flowchart. This document will be invaluable when organizing future efforts. Using the system flowchart, a script can be written and a computer program flowchart can be generated.

Once the script has been written, the team has a "shopping list" of visuals that should be collected. These can be materials that already exist and/or new items. The list of acceptable material includes slides, motion picture media (8 mm, Super 8 mm, 16 mm), videotape, filmstrips, computer graphics, etc. While the team is gathering visuals, the programmer should be developing the computer program that will eventually control the disc player and the presentation of instruction.

After the visual material has been gathered, it must be transferred to a 3/4 inch video tape. From the tape, a company such as LaserEdit, Inc. can produce a videodisc. Some vendors are able to make the transfer within a week.

Once the videodisc has been completed, it is time to view it and identify the starting and ending frame numbers of each segment. This is a time consuming operation, but a necessary one. It is similar to indexing a book. The frame numbers will eventually be used by the computer program to access the proper portion of the videodisc.

Finally, the computer program should be completed and integrated with the new videodisc. If all has gone well, the team will have a useful and productive instructional tool. Since areas on the videodisc can be accessed in an infinite number of ways, users are not bound by the original design parameters. The disc can be used (or repurposed) by any number of other programs.

Interactive video is a powerful and promising technology. New uses for it are constantly being found. Educators are in a good position to take advantage of it. If you find yourself in a position to customize your own videodisc, take advantage of it.

Public Domain Software:
What's There and How to Make Contact

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This demonstration will share information about the various software libraries that make available public domain or shareware programs for the Apple II family, Macintosh, and IBM computers. Sample programs will be demonstrated and made available for copying. A multipage handout, listing software houses and addresses, will be provided.

The first library I want to mention is our own TCEA public domain software library for the Apple II family, Macintosh and IBM computers. Lane Scott has done a wonderful job is putting this library together and keeping it organized and growing. Several features are noticeable. First, these disk contain high quality programs. Second, TCEA prices ($3.00 a disk or 6/$15.00) are among the lowest in the nation and third, fast shipment is promised and delivered. Presently, there are 84 plus disks for the Apple II family, 23 disks for the Macintosh, and 31 disks for the IBM computer. Write to Lane Scott, Public Domain Chairman, P.O. Box 1295, Ozona, Texas, 76943 for a free catalog.

The Software Shopper is a current book that displays Apple II family programs and allows you, the user, to select which programs will fill a disk. The book illustrates and describes over 400 programs within 29 categories. You select the programs totaling up to 300 sectors and the cost is $10.00 plus shipping and handling of $2.00 for each disk. Call their toll free number for more information (1-800-672-6720) or write to Software Shopper, Outreach, Pre-College Programs, Gallaudet University, Washington, D.C. 20002.

The Best Mac Deal written by Chuck Farnham and Judy Rosenthal is a 1986 publication describing thousands of programs (over 113 disks) for the Macintosh. Most programs are public domain while some are user-supported, meaning if you like and use the disk, the author ask that you send from $5.00 to $30.00 to him or her. The Best Mac Deal cost $7.95 plus $2.00 shipping and handling. Mac disks cost $9.00 plus $4.00 shipping and handling. Write to The Public Domain Exchange, 2076C Walsh Ave., Dept. 609, Santa Clara, CA 95050 or call (408-496-0624) for more information. The Public Domain Exchange also publishes a book entitled The Best of Apple Public Domain Software which describes Apple II family software and sells for $6.95 plus $1.50 for shipping and handling. Their Apple disks sell for $5.00 each. They also publish a seasonal Bulletin with updated listing and descriptions of Apple, Macintosh, and IBM disks.

Computer Using Educators (CUE) is back again. After a few years of resting, CUE is providing their "golden oldies" as well as new disks. Some of the new disks were obtained from software companies that folded, making what were once commercial disks now public domain. Others came from Federal funded projects such as the social studies disks entitled "Immigrant". Disks sell from $8.00 to $10.00 each. CUE also has disks for the Pet, TRS-80, and IBM computers. Write to CUE Softswap, P.O. Box 271704, Concord, California 94527-1704 for a free catalog.

The Public Brand Software is a fast growing company which provides public domain and shareware software for the IBM-PC and compatibles Its 56 page catalog provides page after page of software in almost any category. Program descriptions as well as programs ratings are provided. For more information write to Public Brand Software, P.O. Box 51315, Indianapolis, IN 46251 or call 1-800-IBM-DISK. In Indiana call 317-856-1001.

SPECIAL COMPUTER PROJECTS FOR AT-RISK STUDENTS

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Houston Independent School District
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The Houston Independent School District (HISD) 1986 Summer TEAMS Academies project was designed to improve the performance of academically at-risk, eighth-grade students on the Texas Educational Assessment of Minimum Skills (TEAMS) test. Funding was provided by a Chapter 2, Desegregation Assistance Grant. Although the stated goal was the improvement of these students' performance on the TEAMS test, the project provided an opportunity to capitalize on the talents of enthusiastic teachers, the capabilities of educational technology, and the wealth of multi-media curriculum materials currently available. Students completing the Academies passed the TEAMS test at rates superior to those of HISD students overall and developed new, positive attitudes toward the educational process.

This presentation will describe (1) the *1986 Houston ISD Summer TEAMS Academies* project and (2) the curriculum support project, *Preparing for TEAMS - Mathematics Exit Level*, that evolved from the TEAMS academies.

The Houston Independent School District's 1986 Summer TEAMS Academies was a special project designed to improve the performance of academically at-risk, eighth-grade students on the Texas Educational Assessment of Minimum Skills (TEAMS) test. Funding from a Chapter 2, Desegregation Assistance Grant that had the goal of improving the performance of academically low-achieving minority students, provided the unique opportunity to capitalize on the talents of enthusiastic teachers, the capabilities of educational technology and a wealth of commercially available curriculum materials in order to improve student test scores.

The final results of the eight-week Academies surprised even the project designers. Those students who completed the program passed the TEAMS test at a rate higher than the general HISD population and a rate far above what teacher experts would have predicted for their fellow at-risk students.

Of a total of 14 at-risk students who completed (attended sessions on a regular basis) the 1986 TEAMS Academies, 78.5 percent passed the math section, 86.5 percent passed the reading section, and 71.4 percent passed the writing section. All ninth grade HISD students had a pass rate of 77 percent for the math section, 73 percent for the reading section, and only 57 percent for the writing section. Even the at-risk students who participated in the Academies but did not attend sessions on a regular basis (Academy non-complete) had a pass rate almost equal to all HISD students. Their pass rates were math 64.3 percent, reading 71.4 percent, and writing 64.3 percent.

A multi-media approach was used for content-area instruction, including computer software, print materials, audio tapes, videotapes, and videodiscs. A broad correlation of the curriculum materials to the TEAMS objectives was provided to teachers for initial preparation. Ongoing evaluation of materials, including instructional strategies and comments, was emphasized and shared, on a regular basis, by the entire instructional staff.

The project design was based upon the following points:

- Teachers and program administrator were given as much professional freedom as possible, within the boundaries of the project goals, to design the daily lessons and activities for the students.
- In addition to learning the subject matter, students were taught test-taking skills.
- Students were taught study skills and motivated to continue good study habits throughout the new school year.
- Enough time was allotted for the classes to ensure that each student received the maximum impact possible from the project.
- Teachers were supplied with all necessary materials and educational technology.

We consider the program a success for more reasons than the pass rate achieved by the Academies' students on the TEAMS examination. The true measure of the program was that students' attitudes toward school and learning were positively affected. An excellent student-teacher relationship was developed at all sites. As this closer relationship developed, students became less inhibited, asked more questions, expressed more opinions, and interacted in a more productive manner. Teachers enjoyed the program, since they could function as facilitators of learning and act as positive role models.

Although the population served by this program was small, the results were positive and significant. The students themselves acknowledged the many good things about the program. The overall opinion by all participants, students and teachers alike, was that the summer was well spent.

T.I.P.S. for Organizing the Floppy Curriculum

Roxanne Kay Harbert
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At every level, whether curriculum planning or "housekeeping", the computer lab responsibility can be easier. COLOR is the key. Successful pilot studies designed for Grapevine-Colleyville Elementary, Dallas High School Magnets and Brookhaven College prove the advantages of color coordination of district software and documentation. Examine the control. It's easy. And, it works! The Teacher Inspired Product Systems vary the use of meaningful labels, diskette sleeves, check-out, content cards, instruction folders and filettes. Share solutions to develop a model for your growing educational needs. Follow-up opportunity for support to customize to your school's advantage.

The leader of this session identifies an evolving problem as the "software nightmare". She believes COLOR encourages the popularity of CAI across the curriculum. The presentation is a teacher's adventure in critical thinking from problem to solution and from idea to marketplace. The purpose is to help you visualize your floppy diskette inventory as she did....in color....categorized to communicate.

If TEACHERS dreamed up a working system for organizing computer diskettes and materials, what questions would be answered?

The effort began with a shoebox full of hand-fashioned colored paper, an enthusiastic creator and a lot of nice school people. Is the lab "users friendly"? Are expectations set? How do teachers locate software? Can the veteran teacher assign tutorial software to fit individual needs? Could content be measured into curriculum guidelines? Are grade levels, TEAMS, objectives and menu lists available? Is there time to review the courseware or in-service new materials? Who helps new teachers? What about substitutes, volunteers, aides and parents? What's the answer for site licensing and lab paks? Some problems repeated: storage space, replacement sleeves, public domain or swap accumulations, back-up copies and data diskettes? Is the lab a model for student responsibility?

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It should be. Computer companies use color to sell their products because it "looks" organized and attractive. Editors arrange skills or levels with color. They separate subject and copyrights with color. School districts are independent in needs and desires for effective programs and courseware; but, the DREAM management should be common sense. Breaking a computer lab inventory into smaller parts makes cataloging automatic as the software bank grows. Why not create fingertip files that everyone can understand at a glance? Agree on categories and take control of computer time.

That research conclusion led to the development of more than forty trial diskette folders; sleeves in hundreds of selections of colors, textures and weights; and a new and nameless necessity in scores of shapes and sizes. Their creator, Roxanne Harbert, coaxed coordinators at four field test locations to choose from glued and taped prototypes and try new patterns for diskette management. The speaker remembers making thousands of sleeves and labels that color coordinated with hundreds of folders, cards and the newly-coined "filettes". They were used in three consecutive 1987 summer schools and were refined for one full laboratory installation last fall.

In a search for simple care and easy cooperation in a computer zone, five final paper products emerged. The speaker will demonstrate how the pieces account for instant inventory, easy access, reduced loss and misplacement, and on-task behaviors. Color-coding produced efficient library check-out systems, individual print-out and data disk folders, three-way folders for courseware, administrative vertical files, diskettes by periods, card catalog summaries, identification by subject and zestful motivation. The districts uniquely planned curriculum in the computer lab to their best advantage.

Special thanks to these brave and intuitive individuals:

Sharon Burton
Brookhaven College
Farmers Branch

Sunnye Murdock
Carol Garrard
Norma Kinchen
Grapevine-Colleyville ISD

Lou Withrow
Sylvia Edgar
Business and Management Center
Dallas ISD

Eileen Scott
Health Magnet
Dallas ISD

Mass production of these color coordinates is currently in progress. The machine runs will be Texas products under the trademark of Filette Keez. They are a tribute to all teachers who are willing to listen and think out loud. Their focus remains....reaching students.

Using an Ideal Learning/Apple Lab and a Corvus/Lan Tech LAN to Simplify CAI and Teacher Management

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Ideal Learning is an educational software publisher that offers over 30 complete CAI courses which include tutorial lessons as well as drill. These courses are integrated with a Comprehensive Management System, the Curriculum Manager. The courses run on Apple computers with a Corvus or Lan Tech hard disk network.

Ideal Learning is an educational software publisher that specializes in the development and implementation of computer courseware.

Ideal Learning offers over 30 complete courses which integrate with our Curriculum Manager, a comprehensive management system.

The Ideal Learning product line consists of math 1-12, reading 1-12, foreign languages, test-taking skills, science and writing activities. These are regular full-year courses which will correlate with most subject area texts. The objectives of each course are also correlated to the various TEAMS tests and the Essential Elements. The lessons include tutorial and drill as well as worksheets and chapter tests.

The Curriculum Manager allows the teacher to preset student assignments. All student performance data is recorded automatically. The teacher may then generate reports from this information.

The testing component of the Curriculum Manager scores the course tests and has an option to automatically assign any lesson the student has not mastered. It is also able to score locally created tests.

"What Can Be Done in Five Weeks to Raise TEAMS Scores"

Dr. Harry Fullwood, East Texas State University, Commerce, Tx 75428
Dr. Charles Price, Garland ISD, 221 S. Ninth Street, Garland, Tx 75040
Mr. John Driver, Garland ISD, 720 Stadium Drive, Garland, Tx 75040
Ms. Kathy Hearne, Garland ISD, 221 S. Ninth Street, Garland, Tx 75040
Dr. James Olsen, WICAT Systems, Inc., 1875 S. State Street, Orem, Utah 84058

This will be a description of what can be done to raise test scores in five weeks. The activities did not require much additional time from teachers. This was accomplished through increased productivity through the use of WICAT Skills Assessment Test for Texas - (WSAT) Texas.

This presentation will include a description of the acitivities used to raise TEAMS scores within a few weeks. Dr. Harry Fullwood, professor, and Dr. James Olsen, Director of Testing and Evaluation, will address the philosophical and conceptual considerations in raising test scores in a short period. In addition, John Driver, principal, will detail the actions the principal can take to develop and direct the campus improvement plan. Also, Kathy Hearne, training specialist, and Dr. Charles Price, assistant director, will describe how the WSAT Texas (developed by WICAT) should be interpreted and how the reports can be used to pinpoint those objectives that need immediate attention.

YES, YOU CAN WITH APPLEWORKS!

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Create professional looking documents in a multicolumn format for school newspapers, magazines, newsletters, curriculum guides, technical manuals and papers, plus a multitude of student publications. The process involves using all three applications of AppleWorks, and printing to ASCII and DIF files.

Participants in the workshop should bring a blank diskette if they would like to have a copy of the workshop data files.

Yes, you can print AppleWorks word processor files in a multicolumn format for school newspapers. newsletters, student publications, and curriculum guides. You will use all three AppleWorks applications to produce your document by transferring files via ASCII and DIF files.

Start with an edited word processor file. Format the document for printing by setting the left and right margins to zero, justifying the print, and setting the platen width to the desired column width (i.e. 2.0 for 3 columns of print). Lines that appear short on the screen will be spread out in the final document. You can correct this by inserting hyphens followed by a space where appropriate to even out the lines of text. Print the file to disk as an ASCII file by creating a disk printer. By creating the disk printer, a carriage return will be added to the end of each line preserving the margin settings for the column widths. Otherwise, you will lose the right justification.

Make a new data base file from the ASCII file with only one category. Set up a new tables format and adjust the column width to the exact width of the right justified text.

Print this file to disk as a DIF file and create a spreadsheet from the DIF file. Format the column width to show the entire right justified text. Insert blank rows to separate headings and subheadings from the body of the text and to separate paragraphs. Determine the lines of text per column, columns per page, and establish the line breaks that begin each new column. Copy the text for the second column and move it to the new location in your spreadsheet leaving an extra column between. Delete the lines that were copied and repeat the procedure for the other columns.

Format the rest of the columns by increasing the column width to equal the right justification and narrowing the blank column between to create the space between columns. If your document is longer than one page, make the text more manageable by inserting rows between pages. Rows not needed in the final document are easily deleted in the word processor.

Prepare the document for printing to the clipboard by setting the characters per inch, the left and right margins to zero, the platen width to equal the overall width, and turn off the report header at the top of each page. Verify that the document is within or represents the same number of characters as the printer options values allow.

Print the entire spreadsheet file to the clipboard for the word processor. Create a new word processor document from scratch, set the left and right margins to zero, the characters per inch to the desired final format, and the platen width to the calculated overall width. Move your text from the clipboard to this file. Print out the document to check the formatting and make the needed adjustments. The final product can be dressed up by centering headings, subheadings, adding boldface print, and underlining.

Although, the process may sound long and complicated, it is very simple. Start with a short file to learn the routine and you will find that your own creativity will produce documents uniquely yours.

TITLE: ADVENTURES WITH CHARTS AND GRAPHS: PROJECT ZOO

(A two hour hands-on workshop)

STRAND: SCIENCE/MATH ELEMENTARY

PRESENTER: MISS BERBINA (BIRDIE) FANTZ
Teacher Technologist, Houston I.S.D.
Durkee Elementary
7301 Nordling, Houston, Texas, 77076

Project Zoo is a two hour hands-on adventure that introduces a unique program that builds science content and skills in a problem-solving context for grades 3-5. Participants will learn how to teach science and math concepts using a combination of print materials, a filmstrip, activity sheets and a three part computer software program that introduce students to the characteristics and survival needs of animals. Using this computer software, the "first" produced by **National Geographic Society**, they discover how students can apply the content to make decisions and solve problems in science, while developing graphing and measurement skills. Participants are given worksheets and activities that are useable in the classroom.

A great way to end a fabulous week of "Technology Across the Curriculum" is to visit an imaginary zoo during a two hour multimedia courseware adventure workshop on Saturday entitled **"Adventures with Charts and Graphs: Project Zoo."**

This fast pace, exciting adventure requires 100% involvement of its participants as they travel through the four phases of this tremendous new program produced by National Geographics Society.

Upon entering **"ZOO GOER"** (disk 1), the participants team up to maneuver "***feet***" along pathways that lead to five animal houses. While exploring and investigating each house (using interactive simulations), they collect data, organize information, record results and create charts, graphs and tables through the dynamic use of graphic animation. Participants are then debriefed, findings are shared and each type of graph or table explored is discussed. Optional and Follow-up Activities that build specific skills in a number of curriculum areas are provided. (samples of work completed by students at Durkee Elementary are shared with the group).

After a quick off-line activity that gives practice in matching "***clues***" with graphs, participants begin a educational game **"Zoo Collector"** (disk 2). A buzzing of brain storming and the tapping of keys as "feet" scurry through the zoo are intermixed with the sound of scratching pencils taking notes. Each team tries to identify ten "mystery animals" by interpreting data from graphs and tables found at each animal house. Excitement intensifies as points are earned and scores rise. (Points are valuable when proceeding with the rest of this program). Optional and Follow-up Activities are again discussed. The Teacher Utility Section is explored and printouts of the 19 different graphs/tables are examined.

Then for a change of pace, phase III begins with a short audio filmstrip titled **"What Zoo Animals Need"**. This important part of the kit highlights issues that need to be considered to complete the simulation **"Zoo Builder"** (disk 3). This final phase presents a greater challenge as participants apply their skills and knowledge to the complex problem of designing a model zoo. The task is twofold: to place facilities and animal exhibits in an effective arangement on a map; and to create appropriate habitats for the animals they have selected. The program divides this complex task into a series of steps, guides the users in making decisions, records information, and allows the users to manipulate their designs on the screen while receiving feedback on how well their decisions meet the needs of animals, visitors, and staff. A current of excitement is again generated as the program evaluates each design decision and assigns them values that appear on the screen as part of the player's score. Sounds of success are heard as players request hints, alter animal groupings, redesign exhibits, and change the locations of features to improve their scores.

As the workshop is brought to a sudden stop, the following conclusions about **"Adventures With Charts and Graphs: Project Zoo"** are formulated:

It is a comprehensive computer software kit with several different learning tools.
It can be used with an entire class-whether you have many computers or only one and in all types of classrooms.
It is designed to fit science and math curricula in grades 3-5.
It has two purposes: one is to help students develop skills in graphing, measurement, research, and map interpretation, all in a problem-solving context; the other is to deepen students' understanding of the characteristics and survival needs of animals.
It allows progressive student achievement.
It provides sufficient courseware components to provide enough material to be used over a period of time.
The courseware is so easy to understand and use that in-service training is not needed.

To order this exciting multimedia courseware kit contact:

ADVENTURES WITH CHARTS AND GRAPHS: PROJECTS ZOO
NATIONAL GEOGRAPHIC EDUCATIONAL SERVICES
17th & M STREETS NW
WASHINGTON, D.C. 20036
ORDER #80276
PRICE OF KIT: $139.50

OR CALL TOLL FREE 1-800-368-2728

Apple Learning Series-Life Science

By Dr. Kent S. Cochran, Education Support
Apple Computer, Inc.

Abstract Of Presentation

This presentation will be a discussion of Apple's response to teacher's concerns for software bundled for the life science curriculum. The Apple Learning Series -Life Science Package will be covered and each of the software packages will be demonstrated.

There are six software packages bundled with the Apple Learning Series-Life Science. A brief description will follow:

1. Information Laboratory by Addision Wesley, Inc. is a research tool program covering 18 subject areas including cell biology, ecology, human anatomy, heredity, microorganisms, plants, and animals. The program can be used by individual students or small groups to research a life science topic, provide reinforcement and alternative explanation of difficult concepts. learn how to do a database search and study for tests.
2. Science Square-Off by Scott, Foresman and Co. utilizes the familiar strategy of a tic-tac-toe game to provide a format for review and reinforcement of science content. The test generator program allows teachers to construct individualized unity, semester, or year-end tests with easily produced alternate test forms.
3. Science Tool Kit by Broderbund features four on-screen instruments, temperature and light probes, and an interface module that plugs into the joystick port. The experiment guide details a series of fun and enlightening experiments that illustrate important scientific concepts. Using this program, students can turn their computers into science laboratories to measure and record such phenomena as temperature, light speed, and response time.

4. Agents of Infection by Prentice-Hall, Inc. Is a software program designed to supplement the life science curriculum by introducing concepts in a motivation way, reinforcing concepts with individual students or small groups, reviewing concepts, extending and enriching concepts. Concepts covered include the description and identification of three agents of infection, how a virus reproduces in the body and causes disease and way to prevent infectious diseases. The program is divided into three sections: preview, instruction, and evaluation. The evaluation section has an automatic record keeping feature that tracks each student's test performance for up to 100 students

5. Heredity Dog by HRM introduces or provides review of basic principles of inheritance, and helps users become familiar with the operation of these principles. The program uses the dog as the object of investigation. It consists of a tutorial section which introduces or reviews terminology and enunciates some basic facts and a simulation section involving the inheritance of coat-color genes.

6. Biomes by D. C. Heath introduces students to the abiotic (non living) factors that affect groups of similar ecosystems (biomes). First students become acquainted with the abiotic ranges that characterize six basic land biomes: tundra, coniferous forest, deciduous forest, grassland, desert, and tropical rain forest. Then in a simulation, students assume the role of crew members on an exploratory space probe millions of years in the future. Putting to use what they have learned about how abiotic factors affect biomes, students manipulate the variables in an attempt to make an imaginary planet habitable for earth life forms. As students work their way through Biomes, they receive career points, advancing them through levels of Environmental Biologist on the space probe. Biomes includes a management system to assist the teacher in evaluating each student's progress.

BRING YOUR SCIENCE TEXTBOOK TO LIFE WITH LASER VIDEODISC

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ABSTRACT

Optical Data's exciting laser videodisc programs provide thousands of slides and hundreds of bilingual movie clips that make textbooks come to life! The Living Textbook Series provides teachers prepared visual lessons for Life Science, Earth Science, Physical Science, Biology, and Space Science. To assist with your immediate and effective implementation, these lessons are already correlated to Texas' adopted science textbooks.

SUMMARY

Optical Data's laser videodiscs for Life Science/Biology, Earth Science, Physical Science and Space Science provide teachers and students an unprecedented visual library of scientific observations. Imagine a visual database with thousands of slides, and hundreds of bilingual movie clips - any one of which is available at the touch of a single button.

When the laser videodisc player is linked to an Apple computer, these visuals can be sequenced for specific learning and teaching needs. In fact, Optical Data has already assembled a number of presequenced visuals for a variety of lessons, already correlated to your existing science textbooks.

Come see for yourself how these affordable, effective, easy-to-use videodisc programs can improve your students' science performance and attitudes, and enhance virtually any teaching style. You won't be dissapointed!

How Jack Pemberton makes waves in physical science class.

Jack Pemberton of the La Porte Independent School District, La Porte, Texas describes how he makes waves by controlling time with videodiscs from Optical Data.

"I've taught most of the sciences, and I think physical science is the toughest for kids. Much of it happens quicker than the eye can see. So we resort to mathematics as a way of representing things. That's tough on today's kids. They're more concrete, visual learners.

"For years I used films and slides in an effort to allow my students to observe physical phenomena first hand. About four years ago, I began using Optical Data's videodiscs in presentations I make in the school planetarium. At first, the sheer volume of material and the flexibility was what amazed me! Then I learned how to control time.

"Imagine controlling the rate of circulation in Jupiter's atmosphere, or the passage of an eclipse shadow across the Earth, or freezing the instant of impact of a hammer on a mound of clay. This type of control really offers an unprecedented view into the details of physical phenomena. It's the absolute visual dimension I always wanted.

"I now use the discs in presentations that I make to classes, grade 3 to 12. Sometimes I make the same presentation to as many as 25 classes, and yet I can make each presentation fit the interests and abilities of the class that I'm working with.

"I've authored presentations in physical science, chemistry, astronomy and earth science. For teachers who don't have the time to author, I do think Optical Data's Living Textbook Lesson Guide is a viable solution. Either way, videodisc is something the kids just shouldn't miss."

Time standing still in LaPorte, Texas? You bet, and with good reason. So that students can peer a little deeper into the physical universe.

The Living Textbook: Laser technology that cuts through barriers to comprehension.

Explore The Environment With An Apple, Probes And Software

William F. Kernahan
Director of Customer Support
Sunburst Communications, Inc.

Scientists use the computer to crunch numbers, to analyze data and to explore environmental phenomenon on a daily basis. K-8 students in COOPERATIVE LEARNING GROUPS, can do the same with the proper software and curriculum support materials. This session will involve the participants in a hands-on computer exploration of temperature.

A new science probe package — PLAYING WITH SCIENCE: TEMPERATURE — from Sunburst Communications, Inc. will be explored. The program will be demonstrated and all features explored by the workshop leader.

The focus of the session, however, will be to allow groups of participants to conduct their own probes of the environment and to report back to others in their discovery. They will explore the tempature of water, heat generated from light, the warmth of the body — and, still more.

This will be a learn-and-do workshop!

IBM SOFTWARE FOR HIGH SCHOOL SCIENCE

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IBM SOFTWARE FOR HIGH SCHOOL SCIENCE

The presentation will describe IBM's biology, earth science, and physics software, a series of interactive instructional programs designed to help students learn the major concepts, processes, and specific phenomena associated with the study of living systems, earth science, geology, and physical geography. The Scientific Reasoning Series, which describes the scientific process as a problem-solving technique, will also be presented.

IBM SOFTWARE FOR HIGH SCHOOL SCIENCE

I. BIOLOGY SERIES

1. Cell Functions: Growth and Mitosis
2. Chemicals of Life I: The Structure of Matter
3. Chemicals of Life II: Water, Carbohydrates, and Lipids
4. Chemicals of Life III: Proteins and Nucleic Acids
5. Cytology and Histology: Cells and Tissues
6. The Environment I: Habitats and Ecosystems
7. The Environment II: Cycles and Interaction
8. Human Life Processes I: Cellular Physiology
9. Human Life Processes II: Systems Level
10. Human Life Processes III: Development and Differentiation
11. Leaf: Structure and Physiology
12. Light, Plants, and Photosynthesis: Energy in Conversion
13. Mendelian Genetics: The Science of Inheritance
14. Modern Genetics: Chromosomes and Coding
15. Passive Transport: Diffusion and Osmosis
16. Pathology: Diseases and Defenses
17. Plants: Growth and Specialization
18. Pollination and Fertilization: Seeds, Fruits, and Embryos
19. Regulation and Homeostasis: Systems in Balance
20. Taxonomy: Classification and Organization

II. EARTH SCIENCE SERIES

1. Earthquakes
2. Ground Water
3. Hydrologic Cycle
4. Landslides
5. Moisture in the Atmosphere
6. Surface Water
7. Volcanoes

III. PHYSICS DISCOVERY SERIES

1. Investigating Acceleration
2. Investigating Conservation of Energy
3. Investigating Electric Fields
4. Investigating Gravitational Force
5. Investigating Models of Light
6. Investigating Thermal Energy
7. Investigating Wave Interference

IV. CHEMISTRY (Introduction to the following topics):

1. The Elements
2. Inorganic Nomenclature
3. Chemical Formulas and Equations
4. Atomic Formula and Molecular Weights
5. Percent Composition
6. Ideal Gases
7. pH: Acids and Bases in Water
8. The Metric System
9. Solutions
10. Empirical Formulas

V. SCIENTIFIC REASONING SERIES

1. Concept Development: Heat and Temperature, and Graphs
2. Measurement Process: Distance and Area
3. Ratio Reasoning: Crystals and Speed
4. Scientific Models: Batteries and Bulbs, and Families
5. Theory Formation: Reflections and Patterns

Microcomputer Based Interfacing Labs for Biology

James A. Zuhn
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Department of Educational Curriculum & Instruction
Texas A&M University

Educational research suggests that the most effective methods and tools for teaching science are those that involve students in processes of discovery and application of generalizable concepts. By interfacing laboratory computers with external sensors, students can be provided powerful tools for participatory learning experiences. Students using microcomputer based laboratories do more than memorize collections of facts to pass tests; they use learned information and skills to satisfy their own curiosity. Because this type of computer assisted learning is interesting and challenging, students develop intrinsic motivation and rewards for achievement.

In many classrooms, science is taught as a collection of dry, useless facts and formulas. Unfortunately, students in these situations fail to experience the excitement and intrinsic rewards of discovery.

They also learn very little science.

Since its appearance just over ten years ago, the microcomputer has demonstrated unique capabilities for improving science education. Microcomputer based laboratories (MBLs) are proving to be especially valuable in helping students learn both the content and processes of science.

In early educational programs, the microcomputer was used as a device for teaching specific bodies of facts. Its tireless, unfailing consistency was quickly applied to drill and practice routines. Branching capabilites allowed programs to be developed to enhance teaching efficiency according to student responses to programmed questions. Animated computer graphics made such tutorials more attractive than those bound to a book. Although such applications enjoyed success in some situations, critics questioned whether the capabilities of the computer were best used in developing only the lower learning levels of recall and whether unfeeling, insensitive machines could be substituted for perceptive humans as teachers.

Later, interactive simulations were developed, intended not to teach specific facts, but rather to help students learn generalizable concepts through experiential situations without the risk and cost of actual experiences. However, simulations are only as accurate as the programmer's ability to reduce reality to mathematical formulas and they do not allow students to learn the manipulative skills involved in actual investigations. Nevertheless, successful simulations have been praised for allowing students to vicariously interact with nuclear reactors, vast ecosystems, multi-generation patterns of genetics, and other systems which, due to limitations of time, facilities, or hazards, would be inaccessible to normal classrooms or laboratories.

Microcomputer based laboratories, such as those to be demonstrated in this presentation, merge the previously described attributes of the microcomputer with manipulative laboratory experience, allowing students to gather and process real data in actual experimental situations. Through the use of MBLs, the classroom computer is transformed into a multitude of various instruments specially designed to help students discover and develop concepts for themselves. As examples of this versatility, participants in this presentation will use the microcomputer to measure and record heart rate, electrodermal activity, muscle activity, and skin temperature. Participants will perform learning activities to discover how these tools may be implemented effectively in existing curricula.

Participants will also discover that, because sensors interfaced to microcomputers can perform measurements more reliably and consistently than humanly possible, students can obtain and analyze more precise data in greater quantities and with less frustration than by use of conventional equipment. If prefaced with manual operations to assure concrete understanding of processes involved, MBLs can relieve students of tedious operations and enable the learner to expend more effort in higher levels of achievement.

Working within the context of reality, students develop a structural sense of experimental apparatus, comprehending more fully the significance of system components. Given versatile dependable equipment that can be easily comprehended and used, students are enabled to synthesize scientific investigations of their own design.

The subtle difference between utilizing computers in science education as learning devices, rather than using them as teaching devices, will be recognized in student outcomes. Allowing students to participate in the learning process will produce students who find meaning and reward in learning and who transfer that to more positive attitudes toward life and citizenship.

They will also learn more science.

OPEN A "WINDOW ON SCIENCE" WITH LASER VIDEODISC

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ABSTRACT

Optical Data's exciting new bilingual laser videodisc program for elementary science, **Windows on Science**, provides a most comprehensive and exciting approach to effective elementary science instruction.

Included are several thousand slides, and hundreds of bilingual movie clips, each of which are referenced in complete teaching-lesson plans that offer a suggested teacher narrative to accompany each teaching visual. Specific student learning objectives, teacher background information new vocabulary terms, and participatory activities are as well provided.

SUMMARY

Windows on Science was pilot tested in over 100 classrooms across the United States, including Texas school districts in Houston, San Antonio, Austin, Temple, Abilene, Lancaster and Raymondville. Their results?

+ 87% of pilot teachers indicated improved student motivation
+ 76% indicated students improved content mastery
+ 72% indicated students improved use of science thinking skills
+ 93% of pilot teachers found installation and classroom use easy
+ 72% felt it improved their ability to teach science
+ 80% preferred laser videodisc over textbooks, slides and videotape
+ 88% recommended purchase of **Windows on Science**

Join us to see for yourself that **Windows on Science** is an affordable, effective, easy-to-use science program that works!

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How Karen Sconce put thousands of new windows in her fifth-grade classroom.

Last year, Karen Sconce began using Optical Data's laser videodisc programs with her fifth-grade classes. The results were eye-opening.

"As an elementary school teacher, one of my primary goals is to get children interested in science. This can be a real challenge, since many of the concepts are hard for young children to grasp, and existing technologies for teaching them - even movies and video - have their drawbacks.

"Then I field tested Optical Data's Windows on Science laser videodisc package. I was dubious at first, but decided to start with a lesson on volcanoes. I was using an Earth Science disc that contained literally thousands of slides and dozens of movie clips - any of which I could access instantly, no matter where on the disc they were stored. It was a tremendous resource that also had great flexibility.

"My 'debut' day was a little nervous, but the minute Mt. St. Helens went up in smoke, so did all my doubts about laser videodiscs. The children were simply captivated by the whole thing. Especially impressive was the way I could show a movie clip of an actual volcanic explosion, then move right on to a diagram that explained it. The children didn't just understand the concept, they positively absorbed it! Vocabulary was way up, as was extracurricular activity and interest in science generally. I subsequently did a lesson on the circulatory system using the Life Science disc, and it was every bit as successful.

"It's probably a little early for any in-depth evaluations of the program, but let's just say that a lot of children have had an unforgettable look at the world of science.

"A lot of windows - in a lot of minds - have been opened."

Windows on Science: Laser technology that cuts through barriers to comprehension.

The Apple Learning Series: Health Education

By Carrie Wisnoski
Apple Computer
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Houston, TX 77092

Developed for use in health classes, science classes, or counseling offices, the Apple Learning Series: Health Education employs computer technology to address health problems in ways that have proved very effective - especially with "at risk" adolescents. The Package is designed to complement the standard health education curriculum, so its componets can be used with existing textbooks and teaching aids. The Health Education Series includes two very comprehensive software programs, and all the peripherals you need to get started.

The Apple Learning Series: Health Education provides a comprehensive approach to helping teenagers become more responsible for their own physical and mental health. Designed for use in health classes, science classes, or counseling offices, Health Education addresses many of the health concerns of students in grades 6 through 12, dealing in a straightforward manner with such critical issues as body management (weight control and exercise), stress management, alcohol and other drugs, smoking, and human sexuality.

The Health Education Series includes some of the very best educational software developed for the health education/science curriculum area by leading publishers, along with all the peripherals you need to use the programs.

For example, Health Education includes a biofeedback lab with a variety of monitoring devices that enable students to learn techniques to recognize and control the effects of stress on the nervous system, through audio and visual feedback.

Easy-to-use software allows teachers of all levels of computer expertise to successfully use state-of-the-art technology in the curriculum. Best of all, the Apple Learning Series: Health Education provides a foundation for future expansion, a basic setup to which teachers can add hardware and software to meet developing needs.

The Apple Learning Series: Health Education includes the following components:

Software:

- Body Awareness Resource Network (BARN) (Encyclopaedia Britannica Educational Corporation) - includes 45 disks, storage kit, and teacher's manual
- Biofeedback MicroLab (HRM Software) - includes one program disk, user's guide, and accessory devices (detailed under Peripherals)

Peripherals:

Biofeedback MicroLab includes:

- MicroLab interface box, card and cable
- Thermistor and cable
- Heart-rate sensor and cable
- Electrodermal sensors and connectors
- Electromyogram sensors and connectors
- EDS and EMG sensor calbes and connectors

Teacher Support:

- Instruction manuals and other materials that accompany each product
- Teacher's manual
- A certificate good for your choice of the following training options:
  - One Apple Learning Series: Health Education Training Manual
  - One Apple Learning Series: Health Education Training Class

Using Computer Assisted Instruction in the Area of Science

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CAI Lab
Abernathy High School
Abernathy, Texas 79311

With the growing use of computers in the field of education, it is exciting to find quality programs that can be used in the CAI (computer assisted instruction) Lab directed in the area of Science. This session will provide some ideas for supplemental computer programs for the regular Science classroom. There will be a demonstration of some commercial software for Biology, Chemistry, and Physics. There will also be a demonstration of easy, teacher prepared activities that can be designed to focus on some of the special needs of the classroom. The demonstration of software is presented on the APPLE computer.

Our school's CAI Lab first began concentrating on the needs of the students who were exhibiting problems in the area of Language Arts, Reading, and Math. With students experiencing growing success in these areas, we began to try to branch out into other areas of study where many students exhibited weaknesses. One of these areas was Science. We began previewing software that would serve as enrichment for the students, yet did not introduce new concepts. We previewed several programs which adequately met most of the needs of the student in the regular Science classroom. As you know, access to quality instructional software in the computer lab only serves to enhance the regular classroom instruction.

Seeing that there were still areas which needed to be addressed, I began working with the regular classroom teacher to prepare drills for the students that were designed to review and reinforce concepts on which the students specifically needed to focus. The computer gave us optional ways to present the material they were having in regular class for reinforcement

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and enrichment. The computer gave us a way by which those who were having particular difficulty in certain areas could be given extra practice. There was also now a way by which their regular classroom teacher was able to make a quick check on the progress of the student. The best thing about teacher prepared drills is that they can be designed to focus on a wide range of skills the student needs in the content area they are needed most. Many of the programs teachers use to prepare their own drills can be designed and edited with ease.

As we have APPLE computers, we use Appleworks, Crossword Magic, and several programs by MECC to prepare drills for the students. These programs allow teachers to be as creative as they desire. Yet, each program is easy and quick to use. They are also easily edited if one has made a mistake.

Using the CAI Lab in this manner with the Science class has given the student the best of both worlds, commercially prepared programs and teacher prepared drills. It has freed the instructor from some of the time needed for reviewing. It has given the regular classroom teacher a way for a quick pre-test or post-test. It has also allowed more time for the instructor to spend with students who need individual help. The students have exhibited a positive attitude toward the the computers and the software programs.

Using Computers To Enhance The Teaching of Aviation Science and Mathematics at Elementary Levels

Mr. Ed Franz, Mr. John Taylor
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Converse, TX 78109

Presentation will demonstrate one approach for infusing a predominately science curriculum with instructional/tutorial/remedial computer options. Science/mathematics relationships are integrated.

Presentation will begin with a generalized, historical overview of science and mathematics learning trends in the Judson district. Specific reference will be made to the following:

(a) Student interest and motivation
(b) Student performance/trends
(c) Teacher interest and motivation
(d) Teacher academic preparation
(e) General inability of the "system" to reverse negative trends

Involvement of the district in a partnership with the Texas Aeronautics Commission and the Federal Aviation Administration resulted in the acceptance of the aviation science program entitled "Come Fly With Me".

This led to the idea of eventual development of computer software to enhance teaching "Come Fly With Me" as a six week module suitable for the 4th, 5th, or 6th grades. Module includes:

(a) Teacher's guide
(b) Instructional computer software covering main themes and concepts
(c) Comprehensive package of resource materials
(d) Instructional computer software covering science experiments
(e) A strategy for including resource persons from the local community

Presentation will incorporate demonstration of software and will provide hands on opportunities for conference attendees.

VIDEO DISK: A SCIENCE TOOL FOR THE CLASSROOM

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Curriculum-based programs in Chemistry and Earth Science can utilize laser video technology to enhance the presentation of fundamental concepts. The sound instructional design of the programs combined with the powerful graphic cabilities of the medium, promote mastery of difficult core concepts such as Bonding, Diffusion, Plate Tectonics and Planetary motion of the earth.

Video disk technology provides a cost-effective medium for teaching scientific concepts on a group or individual level. Systems Impact, Inc. has designed programs for Chemistry and Earth Science utilizing this medium as a vehicle for the characteristics of effective instruction.

This session will address the elements of these programs that are essential for mastery of core concepts in science:

1. Programs are designed for teacher enhancement rather than teacher replacement.
2. Lesson formats are consistent with the synthesis from the effectivenes" literature (Rosenshine and Stevens, 1986).
3. The source of instructional power lies in the "knowledge base" rather than the technology.
4. Programs were field tested and revised to ensure that both goals of "dynamic instructional pacing" and student mastery of content would be achieved.

In science courses, students are often inundated by new terminology and details in such a way that fundamental concepts may become obscured. The Core Concepts programs use visual-spatial displays to summarize isolated facts into larger functional units and provide frameworks to assimilate new vocabulary and organize concepts. The effectiveness of this technique will be demonstrated in the session.

The presentation of difficult scientific concepts can be greatly enhanced by the powerful graphics of the laser video medium. Segments will be shown on such topics as; Models of chemical reactions, Covalent and ionic bonding, Diffusion, Plate Tectonics and Planetary motion of the earth (among others).

In addition to the instructional design of the program, implementation of the courseware into the curriculum and cost effectiveness of the programs will be discussed.

Data Basing the Cemetery: A Social Experience

Stephen Daniels
Associate Professor
The University of Texas at Tyler
Tyler, Texas

Cathy Smith
Microcomputer Consultant
Region VII ESC
Kilgore, Texas

Cemeteries provide an excellent source of information about early community residents. This data can be collected by students or taken from prepared compilations and placed in a data base. Manipulating this data provides quantitative analyses which reflect the demographic character of early settlers. Migration and immigration data can be organized and compared to national and global patterns. The frequency of symbols and emblems on markers can be quantified and inferences made to uses of leisure time. Actuarial information may also be developed, but care must be taken in determining life expectancy. Cemeteries provide provide a unique and creative way of inductively developing local history.

Data bases have been touted as the way to integrate the microcomputer into the social studies classroom. Inductively oriented courses and instructional programs inherently have several data and informational related problems that the computer can conquer. To meet this need several data bases have been developed and are commercially available which offer social science data ready for classroom manipulations and analyses. Prepared data bases have much appeal; however, students are not provided the investigative and decision making opportunities associated with locally generated data.

A source of readily available information about the past can be found in the local cemetery. The professional literature often suggests that a cemetery be used as a setting or resource for instruction in social studies. These papers generally make a case for the uniqueness of the cemetery as an instructional setting, but offer few suggestions for quantitative analyses.

Most communities have a cemetery dating from the earliest days of settlement. Tombstones in these cemeteries offer a treasure of information which is easily collected. A standard approach to using a cemetery for instructional purposes is to make rubbings of markers using newsprint and crayon. This method of data collection has a certain appeal to students but is cumbersome and not very efficient. In many communities historical or genealogical societies have catalogued all burial sites and compiled the tombstone recordings. The advantages of such a compilation are obvious but can defeat the uniqueness of the setting. The combination of a field visit to collect selected rubbings and a comprehensive catalogue of data provide the ideal atmosphere and accuracy of data collection.

Oakwood cemetery in Tyler, Texas was selected for this project. The cemetery served as the city cemetery for some seventy-five years after the first recorded burial in the early 1850's. Fortunately the East Texas Genealogical Society surveyed and published the records of this cemetery making data collection and entry somewhat easier.

The data base program used in this effort was AppleWorks. This program was selected due to its widespread availability and use in educational settings. As many city cemeteries are rather large, some 2400 in the case of Oakwood cemetery, dividing the task of data entry is a necessity. After the entries are accomplished and compiled in a single file analyses may begin. The period of time the cemetery was in active use is the primary determinent of the areas of study. For the late nineteenth century some potential areas of analysis include:

1. Domestic migration. Places of birth and military service during the Civil War, identified by state militia units, provide the location of former residence. These locations can be categorized, plotted, and compared to the national migration patterns of parallel east to west movement during the late nineteenth century.

2. Foreign Immigration. In most instances tombstones of immigrants indicate their nation or region of origin. Places of birth can be quantified and categorized from which students can draw conclusions about immigration patterns of the late nineteenth century. As in domestic migration, local patterns can be compared to global immigration patterns.

3. Fraternal and Social Orders. The frequency of symbols and emblems representing various orders may be tabulated. Inferences may be made to the significance of these orders and societies and the use of leisure time.

4. Actuarial Charts. With a comprehensive entry of all burial sites some conclusions might be drawn about mortality in late nineteenth century Tyler. However, due to the limitations of the data base included in AppleWorks, statistical computations are not possible. If additional analyses are to be performed, care must be taken in drawing firm conclusions about life expectancy due to the inordinate frequency of infant graves and the realization that Tyler may have been only a stop in a continuing journey.

Cemeteries offer a unique opportunity for early community study. This educational resource provides students an opportunity to work with primary data which can be electronically manipulated to draw conclusions about life in earlier America.

NewsWorks™ III Social Studies Data Base Files

RUSTY LINNEY
17011 Misty Creek
Spring, TX 77379
(713) 370-1902

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Newsweek

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World Community II adds 55 countries to the World Community data base in NewsWorks I. Each country record includes 26 fields of data for drawing comparisons, studying relationships and making hypothesis.

American Industry, 1950–Present provides comparable industrial statistics for major industries along with relevant national economic data such as GNP. Five-year intervals cover units of production, number of employees, value of goods and other information for analysis.

The United States file allows students to explore similarities and differences, trace developments, make regional comparisons and build other skills using state data.

A Program Teacher's Guide simplifies the use of both AppleWorks and NewsWorks—even for teachers and students with little or no computer experience. It also provides you with detailed strategies for integrating NewsWorks into your curriculum—including lesson plans and student activity sheets. Narrative readings provide historical background and current information.

Social Studies Software

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This session will focus on software to use to enhance the social studies curriculum 3rd through 8th grades on your APPLES. Included in this session will be a synopsis of individual software packages, correlation to Texas essential elements, and hints and materials for successful use.

The social studies software we have used works very well as enrichment activities. The use of reference materials, vocabulary, and map reading skills needs to be taught before the students go to the computers. Some software has documentation that provides worksheets or handouts that can be used in the classroom to prepare the students. Other software allows a print out of the information used in the programs. Teacher options are available in some programs that allows adapting the program to the classroom instruction.

Using the computer to enhance the social studies curriculum has proven to be a motivational tool.

THE GOLDEN SPIKE: BUILDING AMERICA'S FIRST TRANSCONTINENTAL RAILROAD

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Participants will have hands-on experience for most of the workshop and will use a new courseware unit from the National Geographic. The presentation is designed to explore methods to teach social studies concepts for grades 5-9 using a combination of print materials,a filmstrip, activity sheets, and computer software. The software is designed so that students can apply the content of the kits to make decisions and solve problems in history and geography. They apply higher level thinking skills to help them conceptualize like geographers and historians.

Using the construction of the first transcontinental railroad as its theme, the GOLDEN SPIKE contains a wealth of historical and geographical information. It develops skills in mapreading as research,creates an awareness of the complexities involved in designing and executing a mammoth construction project, and improves proficiency in problem solving. The emphasis throughout is on student involvement-- students use information that they have been given to make decisions as they build their railroads.

In additions to the two software simulations, the kit provides additional information to help the students design their own railroads. The filmstrip, "Linking the Nation," offers the necessary background information on the historical period during which the railroad was built. The color booklet, "Maps, Trains, and People," provides specific information about the construction of the railroad and contains detailed colored maps of the land through which the railroad passed.

Participants will be able to view portions of the filmstrip and work through the software simulations. They will also be provided materials and activity sheets to use in the classroom. There will be a general discussion of how to use software in social studies classrooms and what follow-up activities are appropriate for this and other units.

The Other Side: A Simulation for Social Studies

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ABSTRACT

The Other Side, a product of Tom Snyder Productions of Cambridge, Massachusetts, is a computer simulation of global conflict which teaches students the difficuities of achieving world peace. As in real life, two superpowers vie for the world's fuel resources while, at the same time, trying to build a bridge of peace between the two countries. If the threat of nuclear war becomes too great, the computer terminates the game. Well received by students, the simulation is a fun and effective way to present the difficult concepts involved in achieving and maintaining peace in a world where there is conflict and distrust among nations.

This computer simulation provides teachers with a fun but educational way to teach students about the need for international cooperation in working toward world peace. Students gain an appreciation of the challenges faced by world leaders and acquire a fuller understanding of the importance of trust between nations. The simulation should be presented to the class as a game. What middle school or high school student doesn't like to play games? This paper will discuss how the teacher can prepare to introduce the game to the class, how to play the game with the class, and suggest post-game discussion topics for follow up after the game is played.

There are several ways the game may be played with the class. It can be played with one or two computers, as a beginning, experienced, or expert diplomat, and in a collaborative or competitive way. It can be played with two or more teams or with the class as a whole. It is suggested that beginners use the one computer game, collaborate rather than compete, and start as a beginning diplomat. In preparing yourself to present the game to the class you should read through the teacher's guide and then take the "test drive" provided in the software itself. Actually play the game with a friend or colleague before playing the first game with your class. The teacher's guide is excellent in suggesting pre-game activities in order to begin your students' thinking about conflict in current events and their resolution.

Introduce the game to the class by using the "test drive" because there are no time limits on your moves. Organize the class into teams and assign two teams for each computer you have available. You may use two computers with the original and backup copies of the simulation and have four teams playing two separate games. Finally, distribute the playing materials: maps, yearly planner sheets, resource manager sheets, reference cards, and summary of possible moves.

There are four steps in playing the game. First, each team plans the moves it wants to make for the year. Then, at the proper time, the codes are typed into the computer. One team may plan while the other uses the computer. Secondly, use the hotline to send messages. Cooperation between nations may keep C.A.D. from terminating the game. Third, execute your moves such as placing a possession at a certain location on the map or breaking the Computer Assisted Defence (C.A.D.) System's codes, or any number of other possible moves that might be made. Finally, read the year end report and take notes to use in planning the next year's moves. Remember that building the bridge of peace is the way to win the game. In the collaborative game, both sides win when the bridge is finally completed without C.A.D. stopping the game because of some threat to world security.

After the game is completed, the teacher should lead the class in a discussion of what was learned regarding some of the problems encountered in achieving world peace. Some of the topics could be "cooperation between nations (teams)", "war and peace", and "the relation of the game to the real world."

The Other Side is quite popular with students. They really get involved with it. The game arouses the competitive spirit; but, at the same time, students learn the importance of cooperation and the need to work together in order to achieve world peace. The teacher's guide is well written with many tips, strategies and resource materials. The simulation is a recreational way to teach a serious educational topic.

The Teaching of Thinking Skills through Data Base Programs

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ABSTRACT: The data base management system is an excellent computer tool for social studies since our goals are to teach information processing and thinking skills. But we cannot expect this tool to teach these skills anymore than we expect a pencil to teach a child to write. We must create interactive environments in which students learn these skills. This presentation illustrates ways we can teach both the tool and the thinking skills. The paper first, explores effective ways the data base management system can be taught; and second illustrates how the thinking skills imbedded in the data base use can be disclosed and taught. One effective means of teaching skills is through direct instruction which begins with concrete experiences which allow youngsters to understand database management systems. This presentation focuses on the instructional design elements of direct instruction, shows how these are developed in two data base activities, and then discusses how one can proceed to insure that the thinking skills imbedded in the experiences are taught.

The data base management system is an excellent computer tool for social studies since our goals are to teach students information processing and thinking. A wealth of opportunity for developing analysis, synthesis, and evaluation skills lies in preparing and searching data bases. But as Hunter points out, we cannot expect this tool to teach these thinking skills, anymore than we expect a pencil to teach a child to write.[1] We must create interactive environments in which students learn these skills.

The selection of a data base as a mediating device requires a set of teacher actions, the things the teacher must do in a lesson sequence; and a set of student actions, the things youngsters must do to have success in the learning experience.[2] For students to process information with this media device, they must learn the tool. But to learn how to use this tool as a device to facilitate thinking, they must learn the thinking skills involved. It must be remembered, that it is important for us to teach children how to process information, but a more significant goal is to teach them the skills of thinking. To accomplish these tasks, this paper will, first, discuss teaching the computer tool and second, discuss the teaching of thinking skills.

Research indicates that the most effective means of teaching skills is through direct instruction. Direct instruction refers to academically focused, teacher-directed classrooms which use sequenced, structured activities and materials. By following the steps of the Direct Instruction Strategy the instructor can teach skills and concepts required to use a data base. This strategy creates an interactive environment which motivates, provides a model, imparts

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[1] Hunter, Beverly. 1987. "Knowledge--Creative Learning with Data Bases." *Social Education.* (January): 38-43.

[2] Rooze Gene E. and Terry Northup. 1986. *Using Computers to Teach Social Studies.* Littleton, Colorado: Libraries Unlimited, Inc.

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information, allows active student participation, gives knowledge of results, and presents guidance.

Elementary and middle school students should begin with concrete data bases for as Parker states, although many students at these levels can operate computer data bases, few understand how they operate. The suggested procedure is: Motivate the children concerning the usefulness of a data base; provide a concrete model using 5 x 7 index cards (records) which contain such data (fields) as: name, age, date of birth, address, place of birth, favorite fast food, favorite video. Search the index cards (file) to answer questions, and critique the simulated data base to find weaknesses in the data and to make suggestions as to what needs to be added.

Built on real experience, children are now prepared to begin working on and understanding database management systems. Transferring the simulated data base to the computer and then using the data base program illustrates the power of this tool and motivates children to make effective use of it.

Since many of us were taught such strategies as Direct Instruction in stand-up, large-group situations, we quite naturally teach children in the same way; this has led to two separate problems. First, as teachers we fail to see that the strategies can be used as instructional design tools; the strategies can be used to design learning centers, games, and learning activity packets. And second, that the thinking skills the lessons teach need to be emphasized if we are going to teach thinking. To teach thinking, we must focus the student's attention on the thinking processes we are using, making youngsters aware of the thinking skills that are integrated in our teaching episodes. As Beyer points out, being involved in the act of thinking is not the same as learning how to think. Two recent articles meet the criteria of using direct instruction as an instructional design tool to prepare coordinated learning activities (learning centers) and games which use data bases and teach thinking: "Teaching Data Base Search Strategies," uses direct instruction to teach the concepts of *arrange*, *find,* and *select* which teach the process skills of analysis, synthesis, and evaluation[1] and "The Data Base: Getting to Know You" which is a motivating activity designed to introduce students to data bases.[2]

The Direct Teaching Strategy is an excellent way to teach the development and use of data bases; but neither the strategy nor the activities cited teach thinking which Beyer[3] defines as the mental process through which individuals make sense of experience. The actual teaching of thinking requires that the children learn the skills of analysis, synthesis, and evaluation. Beyer indicates that teachers can teach a thinking skill, deductively, inductively, or developmentally. Since the children have been introduced to these skills, the developmental approach seems most appropriate. The steps to this procedure are: introduce the skill, execute the skill, reflect on what was done, explain or demonstrate what difficulties can be corrected, apply the skill to new data, and review the skill.

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[1] Hannah, Larry H. (1987). "Teaching Data Base Search Strategies." *The Computing Teacher* (June): 16-23.

[2] Hannah, Larry H. (1987). "The Data Base: Getting to Know You." *The Computing Teacher* (August/September): 17-18, 41.

[3] Beyer, Barry. (1987). *Practical Strategies for the Teaching of Thinking*. Boston: Allyn and Bacon.

"ALL MY CHILDREN"

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This awareness session explores the contributions of well-known handicapped persons in our society from Homer until today. Attitudinal environments which bring about productivity are addressed. It also profiles children currently in school and shares the hope for the future through technology.

"All My Children" reflects an attitude necessary for the nurturance and development of "normal" as well as "handicapped" children. Teachers and the expanded world of instructional professionals play a vital role in the development of our world today. Our attitudes toward the handicapped can make or break the future for these children. A very dear friend once said "Life is not a destination, but a journey." Our journey becomes much more productive and rewarding as we enhance the journey of others.

If we take a mind search through time we truly see how the foolish confound the wise and the weak confound the strong.

Homer, who brought us the Illiad and the Odyssey was blind and a young boy led him throughout the countryside as a bard. Moses was dumbfounded and had to depend on his brother, Aaron, to speak for him as he led the children of Israel out of bondage. Beethoven wrote his highest acclaimed compositions after he was deaf. A blind Milton wrote Paradise Lost. A crippled Lord Byron wrote poetry that burns the hearts of lovers today. An emotionally disturbed Van Gogh created art that is unexcelled in today's values. Einstein was four years old before he could speak and seven before he could read. Leo Tolstoy flunked out of college, Louisa May Alcott was told by an editor that she would never write anything of popular appeal. A stuttering child, Winston Churchill, later brought England out of the devastation of World War and a crippled Franklin D. Roosevelt led his country to new prosperity and hope in the face of defeat. Blind and deaf, Helen Keller astounded the world with her talents. Yet, today, we would not even know her name if it had not been for another great lady named Anne Sullivan.

Today a host of musicians Mel Tillus, Ray Charles, Stevie Wonder, Ronnie Milsap, Jose Feliciano and others amaze us as they perform. Help was brought to the tiny little town of Saragosa because of the efforts of a blind radio announcer who just happened to be there. A one armed baseball pitcher has won national acclaim.

What can we learn from these people? What in their environment caused them to excel? We do not possess all of the answers for these questions. Today, the field of technology is opening new worlds for both the normal and handicapped populations. But for the first time for many these worlds can mesh and we can enter into a mainstream effort where none was possible before. The presentation explores these technological advances with the hope for the future that these advances will be made available in order for all our children to meet their potential.

APPLE IIE IN THE SPECIAL CLASSROOM

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The integration of a computer into an early childhood classroom of special needs children was evaluated in terms of time on computer, software used, level of independence, attention span, and specialized peripherals. The process of classroom modification is traced for a period of three months. The results include progress on the computer and the district's support in training professional staff and in helping to obtain adaptive hardware for individual students. Also, included in the results of this case study are the software that the students were able to use independently or with help.

The use and effectiveness of a computer in an Early Childhood classroom is a topic that has been evaluated by many in recent literature, but there is little concrete evidence that it is an effective learning tool in a classroom setting. This study looked at twelve early childhood special needs students in a classroom setting of a large urban school district. Computer use, software utilization and perpherals were evaluated.

This study was conducted by a classroom teacher who was a novice to computer use. The computer was placed in the certer of activity as there was only one outlet in the room. It was a very large distraction for the students and the distraction was compounded by the fact that the students needed one-to-one attention in order to use the software and the computer. A data base of information was kept for each student stating time on computer, software used, level of independence, attention span and specialized peripherals.

The students approached the computer just as they did any other toy in the room. There was no hesitation to just hit any key or bang on the entire keyboard. The major difference between the computer and the other toys in the room, however, was that it drew special interest from all the student no matter what else was going on at that time. The computer seemed to be magical for the students and drew their attention away from everything else that they were doing.

The software was limited in selection but the students did not seem to mind. They used each piece of software with enthusiasm and each new piece they tried seemed to teach them something and make them even prouder of themselves with the computer.

This group of eleven special young children exhibited eagerness and enthusiasm from the first day of their exposure to the computer. These students approached the computer as a toy and eagerly anticipated their turn on the computer. They each spent differing amounts of time with the computer and their acquisition of skills when using the programs differed from each individual child. All of the students did enjoy success to some degree on all programs and enjoyed the experience of the computer in the classroom.

The case studies generally reflect acceptance of the computer, a high degree of student enthusiasm, varying levels of use and time spent, and exceptional performance of some related to special devices. Integrating a computer into a special education classroom differs greatly from use in a regular classroom. Because of the wide variation in student needs and abilities, and need for special augmentative devices, the teacher should expect varying levels of success. The data collected on the population of eleven early childhood special education students are not meant to be generalized for other individual children. However, the results of this case study may show other early childhood teachers that a computer can be used effectively in an early childhood classroom and can be a good motivator for this population of students.

The teacher must be dedicated to computer use even more than one must be to all different centers. A young child at a computer really needs adult supervision for it to work properly. The computer is a great learning tool if it is used with teacher. Just as a flash card has no meaning without a teacher and student discussing the letter and its sound and the words that start with it, the computer cannot teach a young child without the input of the teacher. The computer can also be utilized to save teacher time. The use of word processors, data bases, and mail merge can cut out countless hours of drudgery work in sending home notes and keeping up with records for use in the evaluation system. Software is available for decorating the classroom and use for stencils and art projects. All of this makes the thought of computer use very exciting for most teachers.

Computer use is attractive to early childhood special education students and teacher alike. It is part of the future and therefore can be a useful tool for the student. The job of education is to prepare all students for a successful future and it is the opinion of this researcher that computer use is an integral part of this future.

APPLEWORKS FOR THE SPECIAL EDUCATION TEACHER

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Appleworks combines three separate programs, with the ability to move data from one application to another: the word processor, spreadsheet, and data base. Word processing for individual lesson plans, assignments, work sheets, and reports. Spreadsheet for roster, lesson plans, evaluation of IEP grouping, scheduling, report cards, grade book. Data base: IEP information, record keeping, lesson plans.

In this workshop we will demonstrate the program "Appleworks" as a right hand tool for the Special Education teacher with its three separate programs that readily move data from one application to another. We will prepare lesson plans for the week on the spread sheet, including, columns for: day, text, objective, materials, "find, tell, demonstrate", activities, homework or vocabulary, evaluation, learning standard or essential element taught, and list the students whose IEP goals are being met. Copy the lists to an individual's word processed lesson plan with the students name on the top so each student has his/her own copy. We will draw horizontal and vertical lines, columns, discuss increasing, decreasing the size of the column, and moving data around the spreadsheet. We will change the name of the spreadsheet, to make a new file for each week, changing only essential data for the new week. Organization for the use of these spreadsheets, in a notebook form will also be demonstrated. Hands on practice and questions will be welcome.

The roster in spreadsheet format can easily be used: to analyze your students by ability, by IEP, for ability grouping, to arrange in alphabetical order, rearrange the same list by grade, or ability level, without reentering the same data time and again using the same list for grade book, and report cards, simply change the file name and make changes for your needs. By entering grades and formulas to the same list you convert the roster to a grade book. It is easy to add or delete a student, and personalize your record keeping.

Moving Spreadsheet and Data Base information into a Word Processor file is handy for reports and individual lesson plans where lists of information are needed such as spelling lists or vocabulary lists, coupled with instructions. By changing the character size of the letters more information and greater emphasis. For the reading impaired it is easier to individualize the print for the student. These techniques will be practiced and discussed.

If time permits we will touch on Mail Merge to create a table-style report of categories of information, Data Base as a form of lesson plan writing, and Word Processor for special reports such as the "School Improvement Plans", and the Word Processor for student use. High priority will be given to the spreadsheet and its formation and use for the Special Education teachers planner and tool.

Appropriate Integration of Computer Technologies into Classrooms for the Moderately Handicapped K-12

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This paper focuses on developmentally appropriate software for three distinct levels of moderately handicapped students: elementary, middle, and secondary school. Specific programs will be discussed which enhance readiness, language arts, math, and daily living skills in these different classrooms settings.

At the elementary level, with students 6-12 years old and functioning from readiness to second grade, the MUPPET LEARNING KEYS provide a modified keyboard to enhance the earliest "discovery" of the computer. The alphabet and numbers are displayed in sequence to minimize searching. As letters are selected, the corresponding graphics can be modified by quantity and color.

When children exhibit readiness for regular keyboard interaction, the UFONICS speech synthesizer teaches alphabet recognition with ALPHABET CITY. When children can find and match letters, the EARLY LEARNING GAMES, name program provides a self-correcting approach for typing names, addresses, or words. When this is mastered, the MUPPET WORD BOOK provides a beginning word prodessor to type these names and words.

Number recognition is taught through the UFONICS speech synthesizer NUMERAL RECOGNITION program. The EARLY LEARNING GAMES counting program provides practice in counting. STICKYBEAR NUMBERS matches quantity with symbol. Addition and subtraction are practiced with STICKYBEAR ADDITION AND SUBTRACTION.

THE ECHO speech synthesizer teaches language concepts with MICROLADS and FIRST CATEGORIES. MICROLADS illustrates verbal directions, while FIRST CATEGORIES teaches classification.

In middle school, when students are 12-15 years old and function from the readiness level up to third grade, some similarity in programming is noted. Although the EARLY LEARNING GAMES and STICKYBEAR programs are still utilized, new programs are introduced to higher functioning students.

MATH BLASTER teaches and drills basic mathematical facts. It contains extensive data files in addition, subrtaction, multiplication, division, fractions, decimals, and percents. It also contains a versatile "editor" which allows you to enter your own set of facts. Students especially like this program because they can enjoy practicing their math skills in a game format. The keyboard and/or joystick can be used. The joystick is encouraged to provide eye-hand coordination.

SPELLICOPTER is a spelling adventure game. To play the game students pilot a helicopter through crowded skies and over mountains to the Letter Field, picking up words, letter by letter, in the right order. This program comes with 400 spelling words and can be used with or without the joystick and/or context sentences. Again with this program you have the option to create your own vocabulary lists. Individualized vocabulary lists include: days of the week, months of the year, number words, color words, and survival words such as telephone, restroom, hot, cold, etc.

At the secondary level, when students are 15-22 years old, some read up to a sixth grade level, and comprehend on a third or fourth grade level. While SPELLICOPTER and MATH BLASTER are still appropriate, a new program is introduced. MASTERTYPE is utilized to teach appropriate keyboard interaction skills. Through this program, students learn the correct typing form and methods.

"CAN I REALLY TAKE IT HOME?":
A HOME/SCHOOL PARTNERSHIP IN TECHNOLOGY

by

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"CAN I REALLY TAKE IT HOME?" describes the Parent Training/ "PARTNER'S Lab/ Computer Checkout program at Brazosview School in Freeport, Texas. The Brazosview program is a working model which includes parent training and weekly open lab sessions which allow parents to work with their children in a supportive atmosphere and build technological confidence. "PARTNER'S participants may also checkout computers, software, and peripherals for home use. Philosophy, strategies, techniques, procedures, and guidelines are discussed. Schedules and "recruiting" practices are shared. (Handouts developed for use by parents and teachers may be obtained in the workshop or by writing to the presenter at the above address).

"CAN I REALLY TAKE IT HOME?" is often the reaction of parents and students who are a part of the "PARTNERS" program at Brazosview School, a public school which delivers diverse, specialized services to students with handicaps. Students, teachers, and parents at Brazosview have been using Apple II computers extensively for the past three years to help students improve communication and other basic skills. From the beginning, parent participation and home/school cooperation have been important goals of the Brazosview technology program. Parents have had the opportunity to participate in a parent training/check-out program which allows students to have access to computers, peripherals, and software during non-school hours.

During the first two years of the check-out program, parents were able to check out an Apple II computer system after attending a training session and assuming financial responsibility for any damages which may occur. Training consisted of approximately one hour of training in hardware and software handling to promote proper care and usage of the machines and materials which were available for checkout. At that point, no one in the check-out program was particularly concerned about sophisticated and innovative uses of computers; just getting to work with computers was an exciting privilege! Those peripherals which required more extensive and on-going training were not offered for check-out except in very unusual situations. There were two main reasons for this: 1) the use of "exotic" peripherals was just beginning to show results and it was difficult to define strategies for use which didn't risk frustration and decreased confidence for the user; and, 2) these peripherals were in very short supply and an accidental breakdown would have interfered with the educational program of the students who used each device.

This arrangement worked well until the third year when increasingly literate students needed to check out not only the Apple II computers, but also the variety of adaptive peripherals and more complex and/or specialized software which they were using effectively at school. Peripherals in this category included Muppet Keyboards, Touch Windows, joysticks, and mouses (mice?), voice synthesizers, single switches, expanded keyboards, and adaptive firmware cards. For these items to be included in the check-out program, parents needed on-going training in caring for, and effectively using these sophisticated devices and software programs. Not only did parents need more training to feel comfortable with these new privileges and responsibilities, but also, school personnel needed assurances that the check-out materials and equipment would by used appropriately and returned safely. PARTNERS, a home/school approach, was developed in response to these needs.

The PARTNERS program is an active training program in two phases:

1) Hands-on "Basic Training" for adults in hardware and software care, "Computerese", "at-home troubleshooting", and introductory productive software operations (i.e. how to talk about and work word processing and graphics packages frequently used by their children); and,
2) Weekly Lab Time in which students, their parents or other adults, work together as PARTNERS.

"Phase I: Basic Training" sessions are designed to be enjoyable for all concerned. Parents attend these sessions without their student "PARTNERS". To the students, this training is billed as "time to help your adult "PARTNER" catch up with you" and in many cases that is exactly what it is! Introductory lessons are brief and reassuring with plenty of opportunity for hands-on skills development. Vocabulary is introduced logically and humorously so that adults will not feel left out when students start using words like "boot up", "RAM", and "word-processing". Much attention is given to developing skills which promote safe, efective use of hardware and software. Adults are told about helpful vocabulary which the students use at school, like the "RULE OF THUMB" (thumb on the software label) and the all-important "STOP LIGHT" on the disk drive. They are "talked through" early mechanical/electronic frustrations as they complete introductory tutorials and become increasingly secure with technology.

Though computer systems (without adaptive peripherals) may be checked out after "Phase I" is completed, parents are encouraged to continue weekly lab sessions which include their children. Those wanting to check out additional peripherals must first be able to use them in the lab. Before check-out is considered, a "PARTNERS" team (parent and child) must demonstrate the ability to prepare, boot-up, use, and shut-down an adapted system. Adults must also be able to support the student adaptive device user the opportunity to learn how to do this these things. In addition, the lab instructor can reassure school personnel that "PARTNERS" who have properly used and cared for adapted computers in the lab are very likely to continue to do so at home.

The "PARTNERS" lab is an open enrichment lab. A lab instructor is available at all sessions to provide reassurance and support to each parent/child group through modeling of strategies and techniques as well as through direct instruction. Though many "PARTNERS" teams choose to work with software and hardware that the students use to direct educational goals, this is left up to each team of "PARTNERS".

The only requirement to be in the Brazosview "PARTNERS" program is being in a partnership! Each partnership has two members - one adult and one child. The only exception to the one-to-one "PARTNERS" team rule is that two parents may come with one child. Two children cannot come with one parent; however, a family may reserve available computer time for several "PARTNERS" teams as long as there is one adult for each child present in the lab, or a parent may attend more than one weekly session with a different child each time. The one-to-one relationship between the "PARTNERS" is effective for several reasons:

1) "PARTNERS" work together and help each other;
2) "PARTNERS" are responsible for their own behavior, freeing lab personnel to assist with technology;
3) computer usage and available space can be efficiently planned and monitored; and,
4) "PARTNERS" can have a special hour together doing pretty much what they choose to do on the computer.

The "PARTNERS" program , now in its second year, has been expanded from one afternoon session per week to four sessions per week: three sessions on Monday evenings from 5:00 to 6:00, 6:00 to 7:00, and 7:00 to 8:00, and the fourth on Tuesday afternoon from 2:30 to 3:30. The evening sessions are full and the afternoon session is well-attended. Mothers, fathers, and adult brothers and sisters attend with the students. Several adults from the community have volunteered to be partners for students who need them. Brazosview teachers are encouraged to attend "PARTNERS" labs with their own children. Partnerships from other schools are welcome if there is space available, however, only partnerships with Brazosview students currently have check-out privileges.

All of the "PARTNERS" in the lab (The instructor is on everyone's team!) have the benefit of learning from each other. The instructor helps the "PARTNERS" with strategies used at school and also learns effective strategies from them by watching them work together. "PARTNERS" teams work on computer-based activities which may increase a child's chances for academic success, raise his self-esteem, enhance his ability to enjoy recreational/leisure activities, and foster his ability to communicate and interact with the world around him.

The "PARTNERS" lab is educational and enriching for all, but, perhaps the most important thing about the lab is that it's FUN in all the best senses of the word! Adults see their student partners succeeding in new ways and actively participate in that joyful experience! Children blossom in the uninterrupted hour of one-to-one activity with that special adult. The instructor knows that what these "PARTNERS" do together is likely to make her efforts more effective at other times. Shared experience and shared effort lead to new successes. Success builds confidence which often leads to more success... and that positive cycle works for "PARTNERS!" at Brazosview!

Emergency Communications With The Hearing Impaired

An Interactive Videodisc Produced by the Students in Educational Technology 660 at Texas A&M University

Dr. Rod Zent, Assistant Professor

ABSTRACT: *Six graduate students enrolled in the Interactive Video Class (Ed Tech 660) at Texas A&M University developed a computer-based interactive videodisc program which teaches emergency medical service (EMS) personnel how to sign with hearing impaired patients. The class incorporated a systems approach with each student handling a particular developmental phase of the project. The students utilized television news film of actual automobile accident scenes to present a realistic introductory segment. The Quest Authoring Program from Allen Communications was used to program the the software. Computed-assisted instruction pedagogy based on Gagne', Wagner, and Rojas (1981) guided the development of instructional sequences. The program was divided into four segments: (1) Signs paramedics use to communicate with hearing impaired patients, (2) Signs patients use to communicate with paramedics, (3) a review of signing procedures, and (4) simulation testing.*

INTRODUCTION: A psychological profile of the typical EMS student (Mitchell, 1983) shows that these professionals are action orientated individuals. The typical classroom lecture approach would bore the typical EMS student. Therefore, the instructional designer must choose a resource that would require active participation of the EMS learner. Since interactive video meets this need, the graduate students in the Spring 1987 Interactive Video Class at Texas A&M University selected "Emergency Communications For the Hearing Impaired" as their interactive video project. Interactive videodisc programs, which are becoming popular as an educational resource, combine the data processing and computer-assisted instruction properties of the computer with the sight, sound, and motion abilities of video into a dynamic instructional environment. This type of instructional approach transforms the student from being a passive observer into being an active participant who can chose the learning path he or she wishes, can proceed at his or her own pace, can review material anytime prior to testing, and can receive immediate remediation for incorrect test responses.

INSTRUCTIONAL DESIGN: Gagne', et al., recommended sequenced events of instruction for computer-assisted instruction lessons. (See Figure 1) These steps were used by the interactive video class as they developed the pedagogy for the program. The narrator explains each emergency sign (e.g., "Where does it hurt?"), shows the steps in presenting the sign, and then invites the student to practice the sign. The EMS student has complete control of the program and can review the sign before continuing to the next lesson. A test follows every third sign so if the student responds incorrectly, the student can repeat the segment for remediation. The final segment of the program presented simulations of emergencies for reinforcement. The students in the class served as actors for the "emergency" situations and EMS personnel and an ambulance from the Texas A&M Emergency Care Team were used to make the scenes realistic.

INSTRUCTIONAL ENVIRONMENT: The work station for the program includes a computer, a computer keyboard, a video screen, and a video disc player. The program was designed so the student knows which screen to watch as the program progresses. Instruction is presented on the video screen, and the computer screen is used for menu selection and testing.

PRODUCTION: Each member of the graduate class, which included Lisa Adams, Corrie Bergeron, Pat McCuistion, Jim (Mo) Moshinskie, Diane Paul, and Debbie Sager, was given a portion of the project to oversee, as flowcharting (See Figure 2.) Weekly meetings outside of class were held to check progress and evaluate results. The graduate students supervised filming in the studio and at locations on campus. Tony Hockenberry of the KAMU staff coordinated filming, and Dr. Zent assisted the students in film editing and completing video titles prior to sending the one-inch finished tape off for videodisc mastering.

FIGURE 1: Sequences of Instruction

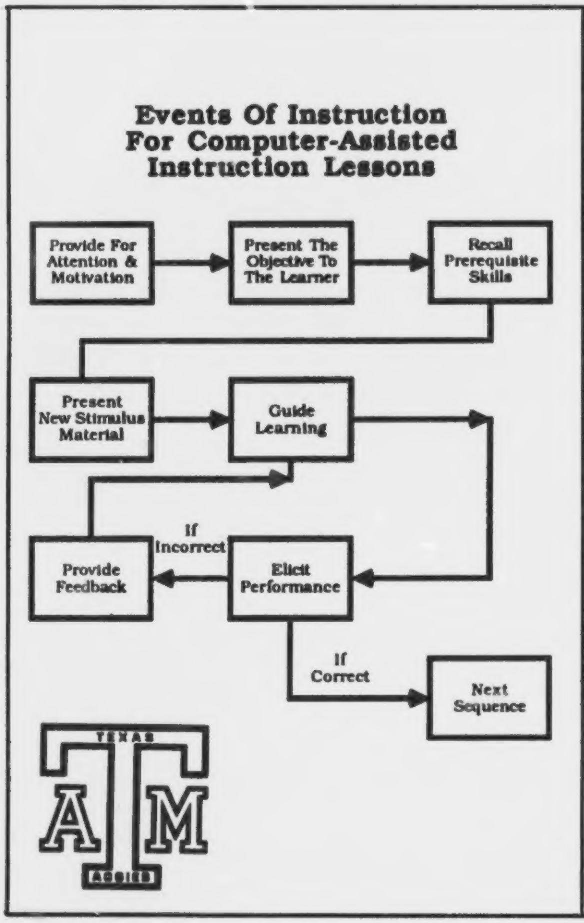
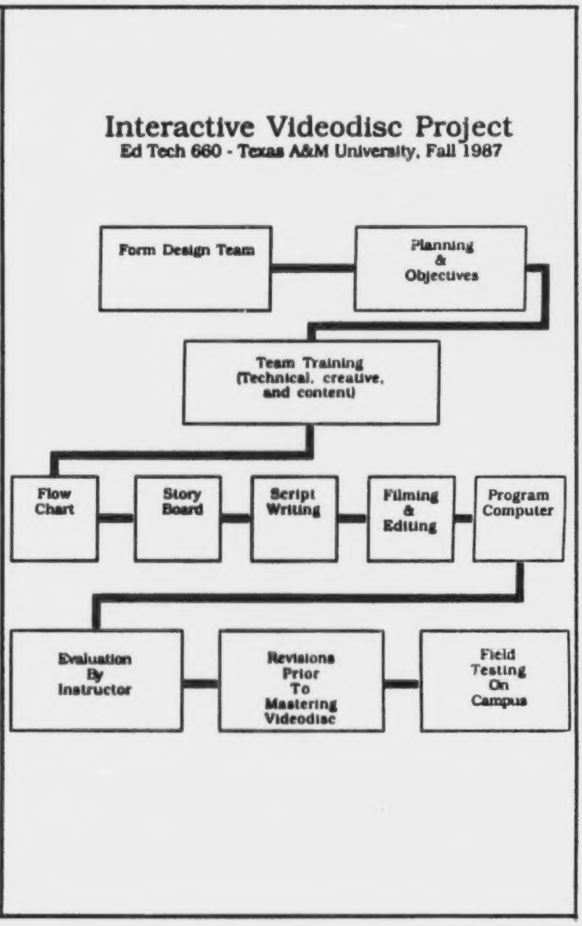

Events Of Instruction For Computer-Assisted Instruction Lessons
Provide For Attention & Motivation
Present The Objective To The Learner
Recall Prerequisite Skills
Present New Stimulus Material
Guide Learning
If Incorrect
Provide Feedback
Elicit Performance
If Correct
Next Sequence
TEXAS
A T M
AGGIES

FIGURE 2: Systems approach to design


Interactive Videodisc Project
Ed Tech 660 - Texas A&M University, Fall 1987
Form Design Team
Planning & Objectives
Team Training (Technical, creative, and content)
Flow Chart
Story Board
Script Writing
Filming & Editing
Program Computer
Evaluation By Instructor
Revisions Prior To Mastering Videodisc
Field Testing On Campus

References

Gagne', R., Wagner, W., & Rojas, A., Planning and Authoring Computer-Assisted Instruction lessons, Educational Technology, 21 (September 1981), pp 17-26.

Mitchell, J. (1984), Critical Incident Stress, Seminar to the Fort Worth Fire Department Emergency Disaster Response Team.

IMPROVING BEHAVIORS AND MOTIVATING EMOTIONALLY DISTURBED STUDENTS THROUGH COMPUTER USAGE

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The computer is used at all levels of education to provide motivation, as a reward, and to act as a tool for building the self-concept of emotionally disturbed students.

Elementary level emotionally disturbed students can be motivated to increase social interaction skills and enhance self-esteem, and thereby increase academic performance by use of proven techniques and procedures of computer aided instruction.

Middle school emotionally disturbed students are reaching the adolescent stage and wanting to be his/her own being. With each student desiring his own way, no consideration of others is apparent. Computers in the E.D. classroom can be used as a motivator to build interpersonal skills. These acquired skills can then be applied to improve their social skills. Computers can also be used to improve academic performance. By using the computers as a reward for successful completion of assignments, the students are more attentive to getting the correct answers - thus more learning. When the students see an improvement in their grades, their self-concept increases.

At the high school level the computer is used primarily to increase the students' self-comcept. By providing graphics for clubs and organizations, our emotionally disturbed students are able to access regular education activities through their computer expertise. The computer is also used to increase motivation for classroom work. Using various software to print assignments is a great incentive for completing daily assignments. This ability to complete a task, and do it well, is a wonderful builder of self-confidence -- the effects of which snowball in a very positive way.

A question and answer period will follow the presentations so that we might be of assistance in meeting the unique needs of the participants. The logistics of computer scheduling in the classroom and software usage will be discussed. Handouts describing software and techniques used will be distributed.

MANAGEMENT STRATEGIES FOR MICROCOMPUTER INTEGRATION IN SECONDARY SPECIAL EDUCATION CLASSROOMS

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The conceptualization of microcomputers in special education classrooms has evolved as an effective instructional entity. This paper focuses on significant attributes relative to classroom management approaches for the integration of microcomputers in special education classrooms. Major topics for discussion will include: (1) the coordination of software and instructional development; (2) teacher-student application and time-management; and (3) evaluation and expectations of computer integration. General guidelines for the development of a personalized management system will be incorporated and multi-dimensional approaches will be analyzed and critiqued.

In any specialized educational setting, instructional classroom management approaches have been created and implemented in order to maintain optimum learning. When microcomputer technology is infused within the instructional process, it can either detract or enhance the educational program. It is inevitable that computer technology will continue to emerge as a means to educate children. Educators who consider themselves computer enthusiast, will embrace computer integrated concepts as a sound instructional method. Those educators who are computer illiterate, may find themselves locked-out of an ever changing educational system.

Once educators explore the technological possibilities of integrating microcomputers into their total instructional plan, a reservoir of challenges will emerge for the teacher as well as the students. Having a computer in a special education classroom can be a fascinating way to provide students with an opportunity to become computer literate. It doesn't have to be a time-consuming, frustrating experience for the teacher.

Whether a teacher decides to utilize the microcomputer as a direct or indirect way to facilitate learning, planning and management is an essential ingredient for successful computer integration.

The teacher's knowledge of each student's abilities is an important factor in the development of a computer integrated management system. Teachers can utilize this infromation for group and independent use of the computer. Also, this information becomes invaluable as one of the criteria for the selection of software. If inappropriate software is utilized, this may impede the instructional process.

Initially, teachers will use the microcomputer to achieve minimal results, as with reinforcement activities and games. As the teacher becomes more proficient, the computer becomes a more viable, flexible instructional device and classroom aid. This is when student computer application and time-management become partners. The teacher can incorporate numerous ways to provide each student with sufficient time to utilize the computer as well as increase the productivity of their own instructional planning.

When a teacher designs a personalized management approach to integrating microcomputers, the chance to develop realistic expectations and evaluation procedures can occur. Once these techniques are instituted, the teacher will be able to utilize the computer in its appropriate place, alongside all the other materials used to help students learn. Successful microcomputer integration in special educations classrooms--is there hope for a happy ending? Count on it!

Non-Verbal Quadriplegic Cerebral Palsy Responds to Computers.

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An intelligent non-verbal quadriplegic cerebral palsied boy with severe spasticity made me search for a communication device and a medium for individual study and expression of his intelligence. Workshops at Region VIII, two visits to Calliers in Dallas, self-study of pamphlets, books, and catalogs, the Computer Conference for Special Ed. in Austin, and a visit to Texarkana, Arkansas Special Education Center added little by little to my need and desire to try cerebral palsied children on computers. The Adaptive Firmware Card has been my switch interface with the Apple IIe and will be with the Apple IIGS. R.J. Cooper's software has been the only software so far that has peaked the interest and ability of my younger/lower functioning cerebral palsied children.

Non-Verbal Quadriplegic Cerebral Palsy Responds to Computers

I am a teacher of the Multihandicapped in Texarkana I.S.D. Most of my students are non-verbal and orthopedically handicapped. I would like to share the way I became interested in using computers with the multihandcapped in special education and the progress I have made thus far.

Four years ago a four year old non-verbal quadiplegic cerebral palsied boy with severe spasticity entered my classroom for the multihandicapped. This boy had attended a Head Start program in Oklahoma. His parents were looking for a classroom and a therapy center where he could receive more than he could in southeast Oklahoma. He could answer questions with his eyes. I needed a communication system for him first, and then a method for him to obtain knowledge when he was waiting his turn for individual instruction.

Workshops at Region VIII, two visits to Calliers in Dallas, self-study of pamphlets, books, and catalogs, Computer Conference for Special Education in Austin, and a visit to Texarkana, Arkansas Special Education Center added little by little to my need and desire to try cerebral palsied children on computers. I was introduced to Linda Burkhart Homemade switches at Region VIII workshops. Before I got any commercial switches I used Linda's material to make several mercury switches to use with battery operated toys, taperecorders and record players. The biggest problem I found with the mercury switches was attaching and keeping them attached to the students when most of them had headrests on their chairs. The students would push against the headrest and push the mercury switch off the head of the student. They all have had better control of one hand and their heads.

Since that first child, I have other children who have responded to switches attached to toys, tape recorders, and the computer. I spent a great deal of time looking for, obtaining, learning to use and finding which switches worked best for each child's handicap. The first commercial switch I used was the Mounting Switch from the Don Johnston Development Equipment Catalog. I still really like the Mounting Switch because it can be used in so many different positions and has a variable pressure setting between 1 and 5 ounces. Some children have such a light touch and others have so much spasticity that they have a heavy touch. I am using the single rocking lever mounted on the side of the wheelchair with a couple of my younger CP children.

The Adaptive Firmware Card has been my switch interface with the Apple IIe and will be with the Apple IIGS. This Adaptive Firmware Card comes from Adaptive Peripherals in Seattle, Washington, and can be ordered out of several handicapped sources catalogs. I will investigate and implement anything that I can get that will aid my children as technology leaps ahead. One area I am not into yet but see a real need is the environemntal control attached to computers for the handicapped. I have parents who are becoming so interested in their child's progress on the computer that they are investigating a home computer system to help their child advance faster. As they get their home computers set up we will work together to develop and train their child in the use of as much environmental control as their child can use and needs.

Software has been a problem for the lower functioning children. The first child could use almost any software for the kindergarten level, but the lower functioning and younger children needed software that was especially designed for their level and ability. R.J. Cooper introduced me to his software that really worked and peaked the interest and ability of my younger cerebral palsy children.

I have an Apple IIGS in my classroom this year that has higher quality color and sound. I have been waiting for the Adaptive Firmware Card for the newer computer. They had such a backlog of orders to fill to meet the advanced technology of the computers that we have not had as much instructional time this year as I would have preferred. My students in the meantime have been working on language acquisition using the Total Program, their switches and the Dial-a-Scan. I expect the response to the language acquisition to improve with the practice on and the fasination with the computer. The computer programs movement on the screen plus the sounds associated with the programs hold the CP children's attention better than other methods. I want to reinforce the words learned in the Total Program with the First Words I and II software written by Mary Sweig Wilson and Bernard J. Fox and distributed by the Laureate Learning Systems, INc. I expect a gradual transfer of their language acquisition from receptive to the expressive using these programs. As they respond in expressive terms we will use the Dial-a-Scan, and the spelling portion in the Adaptive Firmware Card program as their tools much like a normal child uses pencil and paper. If speech will not develop, then we will move on to a more portable speech output than the Apple Computer. such as the Vocaid, Votalker or other appropriate speech output.

The delighted responses from intelligent non-verbal CP Children and the more passive non-verbal CP children on medication for seizure activity makes me enthusiastly in favor of using computers and experimenting to get more from computers as we learn about their capabilities in relation to the non-verbal quadriplegic cerebal palsy child.

ON-GOING MANAGEMENT OF MICROCOMPUTER TECHNOLOGY IN SPECIAL EDUCATION

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ABSTRACT

The Instructional Systems Technology division of the Special Education department of the Dallas Independent School District is implementing the second year of a four year plan to integrate technology into the special education department. As a follow-up to last year's presentation of strategic planning activities, this session will focus on the experiences from the implementation of specific objectives designed to make the integration process a success. Issues related to staff training, equipment distribution, maintenance/repair, communication, software evaluation, and implications for research will be discussed. Problem areas and 'red flags' will also be addressed from a 'real world' viewpoint.

DISCUSSION

The Instructional Systems Technology (IST) division developed a four year plan to integrate technology into special education operations. The plan addresses three major areas, including: 1) instructional and personal computing; 2) administrative and management computing; and 3) planning, research, and evaluation. The plan incorporates procedures to integrate well founded technological applications supported by current research literature, on-going literature reviews, and on-going exploration and product evaluation.

The goal for instructional and personal computing is to view critically computer assisted instruction and computer managed instruction, and to incorporate appropriate technological uses into daily classroom routine. Objectives related to this goal have been developed for both teachers and students. Teacher and staff objectives were developed around the concept of increasing teacher efficiency and productivity. The session will address specific objectives and software programs related to teacher utility, productivity applications, and time management. Objectives for students are focused on providing educational experiences to the handicapped which, as closely as possible, are equal to those of their non-handicapped peers (i.e. bridge the gap, prosthetic device, communication, recreation).

In the area of administrative and management computing, the primary goal is to examine carefully technological applications to facilitate student appraisals, IEP development, student tracking, information management, financial accounting, word processing, state and federal reporting tasks, teacher inservice, and other administrative/management uses. Strategies dealing with staff development for administrators/managers are distinctly different from those employed with classroom teachers. Methods for training both groups will be discussed in this session.

The goal for the planning, research, and evaluation component of the plan is twofold. One goal is to conduct on-going research, evaluation, and planning activities to ensure the eventual employment of the most efficient and effective state-of-the-art technologies which are minimally obsolescent. Secondly, the finding from the on-going research will be used to foster and support the utilization of appropriate technologies through the provision of training, technical assistance and support, and exemplary program replication. A discussion of strategies employed by IST are included in this session.

The best laid plans of "mouse" and men are often waylaid by changes in district policy, state and federal regulations, personnel, administrative priorities (budget, etc.), industry hardware standards, and by practical experiences. Valuable lessons can be learned from others who have plowed the path. Mechanisms for flexibility must be built into any plan. A discussion of techniques and strategies to insure alternative activities will be part of this presentation.

In summary, this presentation is a follow up to last year's TCEA presentation, "Planning and Managing Microcomputer Technologies for Special Education in an Urban Public School System." Having discussed the planning process, program evaluation, and other critical issues related to the effective integration of microcomputers and other technologies into special education programs, this presentation focuses on the actual 'nuts and bolts' of program implementation. Specific topics for administrators and managers will include: decision support systems; staff training and on-going support; needs assessment; job task analysis; hardware configurations; program evaluation; equipment acquisition, distribution and management; and implementation problem areas. Specific topics for teachers and instructional personnel will include: classroom configurations; student scheduling; software selection and evaluation; types of classroom applications; instructional management; and teacher/classroom utilities.

PROJECT TEMPT

Teaching Explorations with Mind-Powered Technology

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ABSTRACT

The purpose of this paper is to detail the implementation of a three-year training project designed for middle school resource teachers in the Ysleta Independent School District. Twenty-nine middle school resource teachers are currently being trained by this presenter to utilize technology in an ongoing fashion to integrate elements from computer literacy and other subject area curricula. In addition, the project relies heavily on learner-centered software rather than drill and practice software, so as to encourage fluency in computer applications.

The recent state mandate to include a component of computer literacy in the curriculum for all middle school students creates an opportunity to maximize exposure to technology for the middle school resource student. Hence, it is intended that the infusion of technology at the middle school level provide the special education student with meaningful instruction and practice in both the special education setting and in the regular education setting.

Current research in the area of the special needs student and the use of computers indicates that new learning options are possible through the use of the computer and learning-centered software which is concept-oriented and pedagogically sound. Such software includes educational games; tool programs such as word processors, data bases, and spreadsheets; and problem-solving software, including simulations and programming in the Logo language.

The curriculum presented here will incorporate meaningful technology instruction across a three year plan to include teacher training and instructional sequencing to meet the unique needs of the middle school student. In addition, each middle school campus houses at least one computer lab which could be utilized for periodic lab instruction (pending availablitly), in addition to the computers placed in each of the twenty-nine middle school resource rooms.

Clearly, the resource students, once provided the opportunity to apply their computer skills across several academic settings, will be in the mindset to approach technology in such a manner as to capitalize on the enthusiasm generated by meaningful computer usage. The goal then becomes one which encourages students to become computer fluent, as the opportunity for ongoing practice is built into the curriculum.

Curriculum Focus

The focus of this curriculum overview is twofold:

1) to use the computer as a tool to promote meaningful interaction with technology; and
2) to incorporate computers in an on-going fashion in the middle school curriculum.

Utilizing learner-centered software presented in a sequence of instruction created by this presenter, resource students have demonstrated the ability to interact with the computer beyond drill and practice applications. By definition, learning-centered software focuses on the student while emphasizing functions unique to the computer which allow the special needs student to manipulate data (e.g., spreadsheets and data bases), investigate systems dynamics (e.g., simulations) and employ translation/transformation (e.g., programming). An additional component of this program includes the reorganization of the resource room curriculum and student scheduling to provide meaningful computer applications of technology across the curriculum.

Recommended Software

Moptown Parade (grades 1-5)
Moptown Hotel (grades 3-8)
Gertrude's Secrets (grades K-5)
Gertrude's Puzzles (grades 3-8)
Bumble Games (grades K-5)
The Pond (grades 2-adult)
Challenge Math (grades 1-6)
Appleworks
Type to Learn
Building Perspectives (grades 4-adult)
The Factory (grades 4-9)
Memory Castle (grades 4-adult)
Incredible Lab (grades 3-adult)
Super Factory (grades 5-adult)
LogoWriter
Newsroom
Discover (grades 7-12)
Survival Math (grades 7-12)
Puzzle Tanks (grades 3-adult)
The King's Rule
Suspect Sentences

Structured Therapeutic Computer Interventions for Problem Behaviors in the School Setting

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ABSTRACT

Within a structured setting, computer games and instructional programs have been used to teach and provide practice in appropriate social interactions, cooperation, planning and decision-making with emotionally handicapped and impulsive, behaviorially disordered adolescents. They have also been shown to be effective in reducing a extreme fear of failure and in structuring therapeutic group discussions.

Computer programs can be used to teach and provide positive practice in cooperation, appropriate social interaction, self-control and decision making. Many programs can be adapted to meet these goals. For instance, the public domain programs Lemonade, Oregon Trail, Oh,Deer, or Pizza, and commercial programs, such as Typing Tutor, The Most Amazing Thing, or Olympic Decathalon are examples of programs that have been adapted within a structured setting to meet therapeutic goals.

Planning is important in adapting these programs to meet specific behavioral goals. A task analysis of the skills demanded, taught or used by the program is necessary. A behavioral analysis of the problem behaviors is also necessary, as well as an understanding of the student's strengths and weaknesses. A task analysis of the Lemonade program, for instance, revealed many skills that were assumed to be present in the user, such as reading and arithmetic skills. Several skills that were being practiced as the game was played included such decision making skills as estimating, forecasting, planning ahead, and using facts to make decisions. These decision making skills are those most often found lacking in impulsive, behaviorally disordered students. Thus, within a structured setting, this program could be used to provide practice in using these skills.

Structure is another necessary component of successful accomplishment of these behavioral goals. The computers were utilized within a setting that included specific steps to gain access to the computer, controlled the time and behaviors permitted at the computer through immediate and consistent consequences, and established a procedure to be followed when using the computer. Time on the computer was earned in exchange for appropriate behavior. Additionally, students were required to earn computer licenses which gave evidence of their level of expertise, and privileges earned. The intervention procedure was based on Michenbaum's (1974) research with impulsive students. Five steps were required to be followed at decision points in the programs. These steps were designed to get the student to stop, look at what is being asked, anticipate consequences, make a decision and evaluate the result. Further, the students were required to use the computers in pairs. This set the scene for social interaction through shared decision making. Positive results were obtained through this intervention. Additional procedures were implemented in order to transfer this learning from the computer to the regular classroom setting.

A concommitant finding from this intervention involved a student with an extreme fear of failure who was often highly disruptive within the classroom setting. A long history of impulsivity and making mistakes, usually followed by red marks, disapprovial, scoldings and failing grades had produced a debilitating fear of failure. The computer program Typing Tutor provided, in essence, overcorrection and positive practice in making mistakes with no negative consequences. A chart was maintained for the student showing progress in error rate and words per minute. After a rocky start, by the end of the term, the student was typing 25 words per minute with less than 10% errors. In addition, she became the office secretary's "assistant", typing envelopes and classroom handouts. Her ability to handle correction for academic errors in the class setting improved.

Programs such as Oh, Deer have been found useful for structuring small group discussions around such topics as the need for rules, handling disagreements with others, expressing thoughts and feelings in appropriate ways, and logical consequences. Decision points in the program are a logical and motivating means to initiate these discussions and then to use the simulation to carry out decisions of the group and see the consequences.

Reference

Michenbaum, Donald (1974). **Cognitive Behavior Modification**. Morristown, NJ: General Learning Press.

THE CHARISMA OF THE COMPUTER

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Speech pathologists describe how they use computers to "turn on" speech/language handicapped students from age three through high school. The computer appears to be the most versatile tool for stimulating, motivating, inhibiting, and challenging students as they improve their communication skills. A variety of software programs and their applications is included.

The presenters were selected to serve as members of the Dallas ISD Special Tech Advisory Committee (STAC) in the fall of 1986. The purposes of STAC were

1. To integrate the use of computers in all areas of special education as appropriate
2. To review software to determine its relevance to specific populations
3. To facilitate completion of the educator's/speech pathologist's work aside from direct student contact.

Of the 150+ applicants for this committee of volunteers, thirty-two participants were selected, three of whom were speech pathologists. None of the speech pathologists had computer experience.

An overview of the training received and a method of introducing the speech/language handicapped to the computer will be discussed. A plan for time sharing of available computers will be suggested followed by a review of approximately 15-18 software programs and how they are utilized with regard to specific speech/language therapy goals. Only a few of these programs are specifically designed for speech/language therapy. A handout listing over forty software programs and the speech therapy objectives to which they have been applied will be available.

Use of the computer with the speech handicapped/special education students has proved to be extremely motivating and has reduced frustration on the part of students and speech pathologists. In some schools these students do not receive computer education as the regular education students do; therefore, they are extremely eager to perform well. Earning a "computer license" in itself may require learning five new vocabulary words and following a four-part command. One is amazed at how quickly this is accomplished by the students---usually within two sessions.

Ms. Wadley and Ms. Zepeda work with early childhood, special education and regular elementary education students, and Mrs. Burden works with secondary students.

Training Teachers to Meet the Needs of Special Children in the Regular Classroom

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During the past few years, the primary focus of microcomputer applications to special education has been on hardware or peripheral device adaptations, courseware selection and evaluation, and in-service training of special education teachers. However, while the general trend for service delivery and program intervention has shifted away from the self-contained model, educators have paid scant attention to teaching strategies and classroom management for using computers with the special student in the regular classroom. The purpose of this session is to address strategies and implications for microcomputer use to support the classroom teacher in expanding instructional possibilities and school experiences for the mainstreamed child. The content outline and pertinent issues for an effective teacher training program will be discussed.

There are four issues to be addressed in training regular classroom teachers in the use of microcomputers to meet the special needs of the mainstreamed child. These are:

I. Identification of the Benefits of Computer Use

With an estimated two million computers in the schools, providing teachers with minimum competency training is no longer a focal point. Many, if not most, teachers have at least minimum exposure to computer use (turning it on and off, loading a program, etc.). However, "computer phobia" has been cited as the single greatest deterrent in the expansion of effective computer use. The major cause of teachers' hesitancy to use the computer stems from a lack of awareness of the benefits of computer assisted instruction, particularly in relation to the special child.

The major benefits of using the microcomputer in the regular classroom are not always apparent. Often frustrated by the demands of the diverse ability levels in the classroom, teachers need to be exposed to ways in which the computer can be the "extra hands" that enable her or him to better reach all students. Having a computer in the classroom can assist the teacher in meeting the special needs of learners at all points on the continuum from the learning disabled to the gifted learner. With the computer, teachers can provide relevant instruction to special students because the computer frees the teacher to work with students who need one-to-one instruction while providing opportunities for independent learning, enrichment, or skill practice on the computer.

II. Identification of Major Aspects of Learning That May Be Enhanced by Computer Technology

There are two major aspects of the learning process where the computer appears to have great potential for maximizing the learning opportunities for students who learn differently. These have been identified as: (1) cognitive skill acquisition in certain areas through defined periods of extended practice; and (2) acquisition of metacognitive and problem-solving skills. It is well documented in the literature that learning disabled students often require longer periods of practice to master particular skills, and the acquisition of metacognitive skills is often slower than the average child's progress in that area. Since it is often difficult in a regular classroom setting to find enough time for adequate learning and practice experiences, the computer can be employed efficiently as a tool in addressing these two areas.

III. Integration of Computer Instruction into the General Instructional Model

Research has clearly defined effective general instructional practices that encompass computer assisted instruction. Teachers are trained to employ one of several systematic approaches to instruction, such as those defined by such scholars as Madeline Hunter or Benjamin Bloom. In order to insure the effectiveness of computer presented instruction, the instruction must be integrated into the systematic progression of a lesson cycle. Examination and comparison of several models reveal that computer lessons can be employed at the "guided practice" level, the "independent practice" level, the "reteaching" level and the "extension" level, defined in several models. However, it is crucial that the role of the computer assisted instruction be viewed as just one component of the total cycle.

IV. Selection of Appropriate Software to Best Meet the Needs of the Mainstreamed Special Child

With over 10,000 programs on the market, choosing the right software to meet the needs of the special child can be an overwhelming task. The problem of software selection has three facets: (1) determining which programs are well-designed to meet the individual needs of special students; (2) finding software that can meet specific instructional goals set by the teacher; and (3) obtaining skills in the application and adaptation of programs. While the first two facets can be addressed through printed resources made available to teachers, the third facet must be addressed through teacher training. Since teachers' time for preparing and mastering new teaching techniques is limited and precious, without familiarity with software that is easily adapted for the special child, the classroom teacher cannot be expected to eagerly and effectively employ the computer as an integral part of the total curriculum.

"Using Technology to Provide Written Output for the Severely Handicapped Child"

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Abstract: This presentation will describe a project at Texas Scottish Rite Hospital to provide severely handicapped children a method for generating written material using the Apple Computer. The program will provide information concerning the assessment process utilized to determine necessary adaptations. Description of the "Word of Mouse" word processing system developed at Scottish Rite will be included. Discussion of methods for successful implementation of this technology in the classroom setting will be included with emphasis on coordination between school, family and hospital. Demonstration of "Word of Mouse" software and hardware adaptations will follow presentation.

Introduction: At Texas Scottish Rite Hospital we have the opportunity to work with many children having a wide variety of disabilities. For many of these children the inability to move the extremities in a normal fashion presents enormous barriers to normal function. Functional independence in many areas of self-care is impossible, and the child's ability to control events in his or her environment is significantly limited. These limitations further impact the normal development of cognitive and perceptual skills as well as the normal personality development. For the child with above average intelligence and good verbal skills the loss of motor function can be particularly devastating.

Objective: As a result of our efforts to more fully meet the needs of these exceptional children a project to interface the computer with adaptive aids has been undertaken. The objective of this project is to put together a system to allow these special children to interact with the computer. This ability to access computer technology would facilitate more normal cognitive development as well as providing a capability for written output. This ability to generate written material in a more energy efficient and speedy manner is an advantage to the child in a mainstreamed classroom setting.

Methodology: In the early phases of the project several hardware adaptations were developed. Many of the hardware adaptations will allow the individual to access mouse-driven software. One such device is a headset which allows the cursor movement to be controlled by the movement of the head. The selections can be made with either a microphone or sip/puff switch. Also, joysticks have been adapted to simulate mouse actions and provide a locking mechanism to facilitate greater ease in using the drawing programs available. The most recent hardware adaptation is a chin wheel. The small wheel can easily be turned with the chin in a very controlled fashion requiring little range of motion.

The second phase of the project emphasizes the assessment process utilized to determine the most suitable method to access the computer. During the evaluation process the child is given an opportunity to utilize several devices. His/her performance with each device is evaluated in terms of head, trunk, upper extremity, and/or lower extremity movements required, cognitive skills required, and possible adaptations needed. A graphic description of child's performance can be generated and thus accurate recommendations can be made.

The information generated during the assessment phase allowed appropriate devices to be identified; however, most word processing software available required keyboard use to generate text. Thus, the "Word of Mouse" software was developed to allow the child to do elementary word processing without using the keyboard. The completed system with hardware adaptations and software enables the child to access the computer and to produce written output successfully.

Results: Currently three patients have been provided equipment to use in the classroom setting. The importance of a coordinated effort between school, parent and hospital has proven to be an integral component to successful implementation of this system. We will be looking toward the individuals involved with these children for feedback. Timed measurements of each child's speed was taken after initial training at TSRH. Repeated measurements will be taken after each child has been utilizing device for one semester. It is our hope to further refine these adaptations and to provide a viable alternative to meet the needs of these children.

USING THE COMPUTER AS A COMMUNICATION TOOL WITH AUTISTIC AND EMOTIONALLY DISTURBED STUDENTS.

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Teacher, Dallas Independent School District

The computer is an excellent tool for the autistic student with normal intelligence and limited speech. Through the use of graphics and single words or short phrases, the autistic student is able to communicate ideas and abstract knowledge.

The computer also provides the emotionally disturbed student an impersonal machine on which to express difficult thoughts and feelings in a safe environment. Graphics also enable the student to express feelings with less anxiety.

The computer is an excellent tool to facilitate communication. Autistic students are able to combine graphics and single words or short phrases to express ideas that they are unable to express in any other way. Emotionally Disturbed students find the computer an impersonal and safe tool for expressing feelings and thoughts too sensitive to express verbally.

The autistic student who has normal intelligence, can use the computer to express many thoughts and ideas by combining graphics with single words or short phrases. Print Shop is excellent software to facilitate this form of communication.

The student first learns the fundamental steps for using the computer, software, and printer. Once the student is proficient with computer usage, freedom is given to use the software at will.

Signs and cards seem to be the most expressive ways to communicate since graphics and few words are used. Since the autistic student has very little use of language in verbal, signed, or written form, graphics help the student to say more than he/she would be able to say with words alone.

The first example that I encountered was done by a young adult male autistic student who made a sign with the picture of an angel on it. At the top of the picture he wrote "God"; at the bottom he wrote "Jesus". This expressed two things: first, that he had a concept of religion, and second, that he was able to understand to some degree abstract ideas which are extremely difficult for autistic students. Many other signs were made making a connection with graphics used.

Emotionally disturbed students also find the computer a valuable communication tool. They too make signs and cards expressing deep feelings that can not yet be expressed in other forms. They are able to use the word processing programs to write things that are to painful or difficult to say to another person. Sometimes they can show what they have written to the teacher. Often times they will print what they have written, but at other times they simply erase it. This allows the student to say things to the computer that he/she is not ready to say to a person.

Each teacher who has a computer in the classroom would be wise to experiment using software the will provide a safe, simple tool for expressing difficult ideas and thoughts by both autistic and emotionally disturbed students.

ON-LINE STUDENT DATA BASES

Lisa Williams, Kerrville ISD; Kathy Kothmann, College Station ISD; Joan Postma, Cypress-Fairbanks ISD; and Betty Pyle, Eanes ISD.

This session will include presentations by representatives from four schools which have on-line student data bases using the "Electric Pages". These data bases, sponsored by TCEA, are promoting telecommunication and the exchange of information between students from all across the state.

The data bases include sections on computer clubs and software exchanges maintained by Kathy Kothmann's class in College Station, a student life section maintained by Joan Postma's class in Cypress-Fairbanks, a student edited on-line newspaper with participating students from across the state maintained by classes of Lisa Williams and Isabell Collins in Kerrville, and a student book review section maintained by students in Betty Pyle and Sandy Bounds' classes in Eanes.

KERRVILLE ISD DATA BASE

The Peterson Middle School's telecommunication proposal stated that students would create and maintain an on-line newspaper. The newspaper was to be produced using "The Newsroom" software. We found that the graphics could not be uploaded and downloaded on the "Electric Pages"; therefore, we had to change the format for the newspaper. The telecommunication software we had did not meet our needs. We could not get a printout of the information on the data bases. We were fortunate to have a student in one of our classes who had experience with telecommunication. He loaned us his communication software and soon we were up and communicating!

Students from language arts classes and ESL classes are creating the stories for the newspapers. Computer Literacy students are getting the stories uploaded on the "Electric Pages" and sending and receiving messages. Several of the computer literacy students have become pen pals with students from other schools that are on-line.

We wanted to inform our school, district and community about the wonderful experiences our students have had with telecommunication. We made hardcopies of the newspapers and created booklets for distribution to the school board, superintendent, building principals, and other administrative staff. Copies have also been placed on display in the Peterson Middle School Library. We felt it was very important for students who have created articles for the newspaper to receive hardcopies of the issue which featured their story. Local newspapers have featured articles about our students' telecommunication project and have included pictures of students and their work.

We feel that students have enjoyed learning about this "new" technology. They are pleased to know that their work has been published and read by other students across the state.

CYPRESS-FAIRBANKS ISD DATA BASE

The proposal Cy-Fair made to TCEA is outlined as follows:

Overview

Cy-Fair ISD's computer literacy II class will contact all junior high and middle schools across the state by letter in order to collect information about the telecommunications hardware or software each school has. Each school will be invited to participate in an on-line survey bulletin board. The on-line survey bulletin board will be conducted for those schools participating in order to share information between schools about student life from other areas across the state.

Component Parts

Enter all junior high schools listed in the Texas School Directory in a data base to print out mail labels in order to contact all the junior highs in Texas by letter.

Post a survey on the "Electric Pages" which participating schools can respond to on the "Electric Pages". Each school will be encouraged to conduct a local survey using their own data base to compile local results.

Each school should upload their results on to the "Electric Pages" to send Cy-Fair their results.

Cy-Fair will post the results on the bulletin board for all to see. The results of the survey by letter will be made available to TCEA in order to develop guidelines for further programs to encourage telecommunication projects.

COLLEGE STATION ISD DATA BASE

At A&M Junior High, College Station ISD, the proposal for the data base was generated by the school's computer club. And, because of their interest in the club and the additional experiences it afforded, they wanted to maintain a data base on computer clubs. We logged onto the "Electric Pages" to check the format of other sections. Then we subdivided the top 10 to club activities, BBS's, game reviews, and software exchange. The intent was to provide a means for sharing computer club experiences, whether the club at the different schools was extra-curricular or included in the computer literacy course.

After our proposal was accepted, this year's computer club, composed primarily of students who took computer literacy last year as seventh graders, wrote the initial articles, the banner, the heading, and created our data base. The computer literacy classes have been included in writing additional articles and reworking the banner and the heading. Some of the articles describe the BBS which the computer club operates from my classroom (Kitten Korner, 409/696-1122, 300/1200 baud, 24 hours a day). My original plan was to rotate the classes so that each week a different class would update the data base. This has not worked as we hoped. Some weeks just seem to fly by with no opportunities. The most interest, however, has been generated by an offer from the Cy-Fair students to set up a pen pal exchange. Many students have indicated an interest in this. We uploaded an initial set of "My name is and I'm interested in"paragraphs, merged from as many AppleWorks files. Here at Thanksgiving, we are eagerly awaiting our first response.

The software exchange is also exciting many of the students, but so far we have a major problem. In order to have the software in uploadable/downloadable format in our data base, it must be uploaded in binary format rather than ASCII. We are currently looking for some Apple public domain software that we can also include in the data base exchange that will allow all of us to use the downloaded programs. We can up and download programs fine. The problem is that the programs are unusable after being downloaded because of the Apple operating system. We are using MouseTalk for communications on an enhanced 128K Apple//e which has an Imagewriter printer, and Apple Personal Modem (300/1200 baud), and a mouse as peripherals.

EANES ISD DATA BASE

Computer students from the two Eanes ISD middle schools in Austin have been delighted to discover how to participate in the telecommunications project sponsored by TCEA. Our initial attempts at providing a file of book reviews was very frustrating, for we discovered that we did not have the capability to upload a real file---i.e., a database created in either Microsoft Works or PFS File. We had hoped to provide a section of the student database that would truly do an on-line search by field for books that were recommended by other students in Texas.

After a frustrating month of feeling ignorant, we finally realized that at this point, what we need to do is create separate short book reviews as word processing documents and then upload them one at a time. In cooperation with our language arts teachers, we obtain short summaries of books our students recommend for pleasure reading. We then type each review as a text document in MacWrite 4.5 and select SAVE AS from the FILE menu. It is important, after giving it a name, to save it as TEXT ONLY and then select LINE BREAKS when it asks about carriage returns. Once saved, it can then be uploaded through the "Electric Pages" to our section of the TCEA databases. We use MacTerminal software on a Macintosh with a 1200 baud modem.

The two middle schools participating (Hill Country and West Ridge) are not only providing book reviews to the student section of the TCEA project, but we are also telecommunicating with each other during our computer classes. It is exciting to the students to see the instant responses to our questions and comments. Several of our students are trying to master becoming pen pals through this student project with other schools participating. We realize that we are making mistakes and have a lot to learn, but we are delighted to have the opportunity to improve our competencies. It seems a very appropriate part of Computer Literacy education. Thank you for helping us learn this new application of computer technology.

TEA Telecommunications Pilot Project Report

Connie Stout
Division of Educational Technology
Texas Education Agency

During the past two years the Texas Education Agency conducted an experimental pilot project using a state-wide electronic mail, bulletin board, and teleconferencing network. In April and May TEA, and NIS (National Information Systems, Inc.) personnel visited the pilot sites and talked with personnel to determine their experiences, attitudes, and recommendations about using an electronic network to communicate with TEA and other schools. A report detailing these observations and recommendations was presented to the State Board of Education in September. This paper summarizes the report and highlights the recommendations derived from this project. It also describes some of the features and benefits of the Texas Education Agency electronic network.

For approximately the past two years TEA has conducted an experimental pilot project using a state-wide electronic mail, bulletin board, and teleconferencing network. Fourteen school districts and one educational service center were subsidized by the Agency to participate in this experimental use of technology for communicating between and among school districts and the Agency. A total of 48 sites were involved. The pilot sites agreed to participate in training, to examine critically the information posted on the bulletin boards, to use electronic mail, to test the local area network software being developed by the contractor, and to provide information for a study of this experiment.

In April and May TEA, and NIS (National Information Systems, Inc.) personnel visited the pilot sites and talked with the superintendents, building principals, teachers, secretaries, and service center personnel to determine their experiences, attitudes, and recommendations about using an electronic network to communicate with TEA and other schools. Based on their feedback, TEA and NIS have learned valuable lessons regarding the operations and management of a statewide electronic network. A report detailing these observations and recommendations was presented to the State Board of Education in September. Recommendations were made for the continuance and expansion of TEA's use of networking services. Currently over 520 districts are on-line.

The electronic network is configured to handle the volume which could over load a state-wide electronic network. The network is also designed to reduce cost and improve the ease of use of the system. It is hoped that each district will eventually maintain or have access to a local network "host" machine which will be updated daily from the State's central host by placing a call to the central host. This "update" procedure will transfer any additions or deletions from on-line databases in TEA-NET and will also transfer all mail bound for users of the local system. Local users will be able call the local network "host" which will provide local netwoking services such as mail and bulletin board information. The result is that administrators, teachers, and students will spend on-line time uninhibited by connect cost accessing information on their host.

The software, the Network Kit, makes this configuration possible. It consists of a modem software package and software to establish a district host. The modem software, known as InfoAccess, can be used on IBM compatibles and the Macintosh. An Apple IIe version of InfoAccess will be developed soon. The host software currently works on IBM compatibles. A host version for the Macintosh is also planned.

The combination of host and access software provides a communications system which allows "automatic" transfer of mail and other documents throughout the system. An integrated text processor and other utilities make the software very convenient to use. The end result could be a state-wide digital network.

Following recommendations from the pilot study, two districts have been established as model districts. These districts are studying the effects of districts using electronic communications for distributing information and messages while eliminating most of the paper distributed among all campuses. The results of this study will be used to help other districts who want to implement a local electronic communication network.

Teaching Telecommunications in the Schools

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Teaching telecommunications in the schools has thus far been a matter of trial, error and experimentation. Teachers have had to make a go of it on their own, without adequate training or resources. As telecommunications continues to grow beyond an estimated 10% of american schools, sound strategies and practices are now evolving. This session is an overview of the issues, curriculum and design for teaching telecommunications skills in the school setting.

Teaching telecommunications in the schools has been largely an effort in show and tell, or database access. Newer strategies and topics include:

1. Teaching the issues of telecommunications. Discussion of such topics as privacy, socialization, tele-commuting, electronic cottage industries, and electronic espionage are becoming commonplace.

2. Using Telecommunications simulators. The increased use of telecommunications simulators has brought renewed enthusiasm to telecommunications instruction. The power of simulation can be used to defeat the perennial problems of equipment bottleneck and connect time charges.

3. Exploring online resources. Many telecommunications-teaching educators have discovered vital and inexpensive online resources that enhance their classroom, from the local BBS or university mainframe, to various free online services. These online resources are rapidly becoming an important part of the online classroom.

4. Information Retrieval. The use of the online database can be an integral part of a telecommunications curriculum. Beginning with database simulations, and on through actual access, cost effective programs are now being offered by various services that make information retrieval more palatable to our budgets.

5. Teaching telecommunications ethics. An ever-increasing awareness of the need to teach the conventions of acceptable online behavior is becoming commonplace in schools. This is an essential social responsibility that abutts our efforts in utilizing this new technology.

TELECOMMUNICATIONS WITHOUT A MODEM!!??!!

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Have budget cuts put a crunch on teaching telecommunications? There isn't a phone line anywhere close to your computer room! Your principal says "A modem--You must be crazy!"

If these are the problems at your school - then this is the session for you! **"Electronic Mailbag"** is a BBS store and forward simulation program that can meet your needs. Students will be taught the art of telecommunications with this program and really make them feel like they are on-line. Included in the lab session will be **"Electronic Village"** and **"Windows on Telecommunications"**, programs that explain the jargon of the telecommunications world. All three programs are multiboot, group oriented and highly interactive. Participants will find useful tips on teaching telecommunications skills without the expense of a modem or the hassle of getting the phone line into the lab.

"Electronic Mailbag" - This software is capable of allowing your students to develop the skills needed to learn to use telecommunications without the hassles and expense of a modem, communication software, and the phone lines necessary to put your lab on-line. Telecommunication is an area that needs to be addressed in curriculums that are using computers. Through on-line experiences students can expand the information and interaction with experts in all areas. "Mailbag" can give the students the skills necessary for them to learn the art of store and forward message sending. In this session participants will have hands-on experience using the three levels that are available with this software and will be able to interact and send messages to other participants in this session, which is a simulation of being on-line and doing some real BBSing.

This program can be used in many of ways across the curriculum, we will discuss the following:

- Thematic Conferencing
- Dear Abby
- Developing Writing Skills
- Practicing Foreign Language Skills
- In the Counseling Center
- Pen Pals
- Classroom Message Center
- Problem Solving
- Anonymous Participation

"Windows on Telecommunication" - Does all the jargon of the telecommunications world seem to be too much for you and your students to learn? This software program will be just the answer for your overloaded circuits. It is a simulation that will actually show you the difference between 300 BAUD and 1200 BAUD rates on the screen so that you can comprehend what is happening. Through little windows such vocabulary as LOG-ON, ON-LINE, MODEM, CHATTING, UPLOADING, DOWNLOADING, BAUD, etc. are described and simulated. These simulations will provide your students with skills and knowledge that can be reinforced later through worksheets that are also provided in this software package. Students will be shown the different types of modems and how they are connected to a computer system.

"The Electronic Village" - This software package is a simulation and tutorial introducing telecommunication and bulletin board systems. It shows how a computer can connect your home to many other homes through the bulletin board system, together all the systems set up an "Electronic Village". You will actually get an opportunity to **post** a bulletin of your own on the board, be able to give **FEEDBACK TO THE SYSOP**, read the bulletins in the general area, check out the ski conditions for Aspen, name 3 of the bulletin board members from the member listings, **page the sysop**, and many other skills that are needed when you really get "hooked-up" and on-line. Uploading and downloading can be simulated saving valuable time and money learning these skills off-line.

During this lab presentation all three packages will be demonstrated and discussed. Tips on how to set up the software and teach these units will be given. It is the philosophy of the presenter that everyone can learn, and telecommunications no longer needs to be taught only to the students of the districts that can afford all the frills of hardware, software, and phone lines. Telecommunications skills are going to be a necessity for the future of our students, as well as ourselves. Telecomputing ranks third for most regularly use of computers in the workplace. This ranking is after storing information and other data processing, but ahead of word processing which ranked fourth. If we are to prepare are students for the workplace, then we must give them some telecommunication skills. The software programs that are demonstrated in this session may be the answer for your district to fill this gap in educating our students across the curriculum.

"The Network Kit Communication Software for Texas Schools"

Presented by Flynn Nogueira, Vice President, National Information Systems, Inc.
"THE ELECTRIC PAGES" P.O. Box 2550, Austin, Texas 78768. (512) 472-6432.

"The Network Kit Communication Software for Texas Schools" demonstrates how districts statewide are using The Network Kit to: communicate more effectively with the Texas Education Agency and other education groups on THE ELECTRIC PAGES, reduce monthly connect charges and implement their own district-wide telecommunications networks. The presentation also presents the results of the study conducted by National Information Systems, NIS, for the Texas Education Agency. The study has been presented to the State Board of Education Long Range Planning Committee.

An electronic network service offers an extremely efficient way for large organizations to communicate through electronic mail, electronic conferencing and file transfers. The problem, however, is the expense in connect time and unfriendly software.

NIS, under the guidance of the Texas Education Agency, has developed The Network Kit, a multitier network design that allows large numbers of people to communicate with maximum efficiency and minimal cost. The Network Kit has evolved based on usage and experience of THE ELECTRIC PAGES over the last four years.

Using The Network Kit, access to THE ELECTRIC PAGES is easy, convenient and economical. Moreover, The Network Kit provides districts the ability to create their own "ELECTRIC PAGES" in-house.

Background

NIS started THE ELECTRIC PAGES, a telecommunications network, in March 1983 with a legislative bill tracking program sponsored by the Texas Association of School Boards (TASB). NIS and TASB implemented the bill tracking program with 19 school districts and one service center. These local education agencies were able to track, on a daily basis, the status of the bills TASB was following.

The program was well received. So well, in fact, that other districts joined the system and TASB increased the amount of information disseminated. Currently 520 local education agencies access the system. The number of education groups that publish information online has also grown. In addition to TASB, districts are able to send and receive information electronically from: Texas Education Agency, Texas Computer Education

Association, Texas Association of School Administrators, Texas Community Education Association, University Interscholastic League, Texas Teacher Retirement System, Texas Association of Community Schools, University of Texas.

Districts access THE ELECTRIC PAGES using any type of computer, modem and communication software.

In September, 1987, NIS presented the results of a study it conducted for the Texas Education Agency to the State Board of Education. The purpose of the study was to determine the effectiveness of using an electronic network to communicate with Texas schools. The results of the study are published in the report, "TEA Telecommunications Pilot Project Report," which is available from TEA. The study includes recommendations made by the pilot districts who participated in the study along with an extensive cost analysis on projected savings to TEA in implementing a statewide electronic network.

One component of the study was to develop and test communication software which would allow a more economical and efficient way for all Texas school districts and campuses to communicate with TEA. To meet this objective NIS has developed the concept of a multitier network and developed communication software, The Network Kit, which implements the concept. The purpose of The Network Kit is to provide solutions to the problems encountered by TEA and THE ELECTRIC PAGES in serving Texas educators. The Network Kit has two components: InfoExchange, the local host software, and InfoAccess, the user access software. InfoExchange is the interface with the central ELECTRIC PAGES host in Austin. InfoExchange receives and stores statewide data bases and serves as the electronic mail collection and distribution station for the local education agency. InfoExchange then serves all InfoAccess callers in the district through local telephone calls. Thus, information and communications from the state host are distributed throughout the state through InfoExchange.

Currently all districts and campuses who access THE ELECTRIC PAGES must sign on to one host computer, i.e., THE ELECTRIC PAGES host in Austin. By placing InfoExchange at the district level, the process of accessing information and mail is distributed and the cost is affordable. The design of The Network Kit allows the system to move from a low-volume, low-subscriber environment to a high-volume, high-subscriber environment.

The software has been designed to function identically on several different operating systems. At present the software is available on both the MS-DOS and Macintosh microcomputers.

The goal of NIS is to create a "highway" whereby all educators and education groups can share information efficiently, easily and economically. With The Network Kit, this goal is a reality.

For more information contact Flynn Nogueira at NIS, (512) 472-6432.

USING TCEA'S ELECTRONIC BULLETIN BOARD

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=TCEA ELECTRONIC RESOURCE CENTER==================================
1.. TCEA News
2.. TCEA Educational Computing Calendar
3.. TCEA Student Section
4.. Texas Education Agency Technology Department News
5.. Tips and Techniques from Apple - Rich Park
6.. TCEA Public Domain Software - Lane Scott
7.. TCEA Membership Information
8.. TCEA Resource Center Sponsor Information - Apple Computer
MSG.Send a Message to TCEA Electronic Editor - Randal Douglas
Q.. Quit
==================================================================
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*==* Type  NEW  to see only the new items       *==*
====Type Entry number to enter a section or =====
====Type  H  to see the TCEA Main Menu or =====
====Type  Q  to exit TCEA                     =====
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The Texas Computer Education Association offers anyone with a modem and a subscription to the Electric Page's telecommunications network the ability to communicate with the TCEA board members and keep current on TCEA activities. News items of interest to computer educators and TCEA membership are posted in the 'TCEA News' section. A current calendar of upcoming events, especially those computer related events in Texas, are maintained in the 'TCEA Calendar' section. New to the electronic bulletin board this year is a section specifically designed for students to exchange information and learn about telecommunications at the same time. The 'TCEA Student Section' is maintained by students in computer literacy classes around the state.

The 'Texas Education Agency Technology Department' maintains a section to help keep the membership informed about the state activities that may affect the nature of computer instruction. 'Tips and Techniques from Apple' is maintained by Rich Park at Apple Corporation to give suggestions to Apple computer users on how to get more out of their Apples. Lane Scott maintains a section on the board that allows the membership to see what is new in 'TCEA's Public Domain' library. Users can also place orders on-line. The 'TCEA Membership' section not only gives information about how to join TCEA but it has a listing of the board members on-line box numbers where you can send messages to them. Any questions or concerns that you might need to send to the Electronic Editor can be done quickly and easily by using the 'MSG' choice from the main menu.

Like other data bases on the Electric Pages a feature that allows you to get on-line, get what you want, and get off-line quickly to save money is the 'NEW' command. Instead of selecting a choice from the main menu simply type in NEW and either indicate a date or press return to have the computer indicate everything in TCEA that has been added since the date you select or the last sign-on.

The TCEA network is growing......come grow with us !

What's New in Telecommunications: Ten Hot Tips for Educators

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This session focuses on new and advanced developments and concepts for the experienced educational telecommunicator. The latest advances in communications software, hardware, dialing from difficult situations, telecommunications simulations, free or inexpensive telecommunications experiences, modemless machine transfer, transmitting graphics, new transfer protocols, telecommunications ethics guidelines and less costly phone access are discussed and demonstrated.

The field of educational telecommunications is constantly changing, improving, and becoming more practical. Ten useful trends or concepts are worth consideration even by the most experienced telecommunicator.

1. The Newest and the Best in Communications Software. For the Apple computer, look at ProTERM, MouseTalk and Modem Manager. For the IBM, look at SmartCom III and HyperAccess. Procomm and Dcomm 3.3 still hold the edge in shareware.

2. The Newest and the Best in Modems. The finest modems on the market for the money now include Hayes, Leading Edge, Practical Peripherals, Mitsuba, and Prometheus, to name a few.

3. How to Dial from Just About Anywhere. Using appropriate tools or techniques, you can dial from just about any location or school. By using either acoustic coupler extensions, pseudo-dialing, extension cables, hotwires, line splitters or other techniques, your phone system can be hurdled at last.

4. Telecommunications Simulations. One of the biggest problems in telecommunications instruction involves providing enough student access to online experiences. The classroom logjam with one modem can effectively be remedied with a variety of telecommunications simulators, including THE ELECTRONIC MAILBAG and WINDOWS ON TELECOMMUNICATIONS. These programs allow students to be trained offline. Skills learned are easily transferred to actual online situations.

5. Free Connect Experiences. Schools need not pay for extensive phone or connect charges for telecommunications. There are many free or inexpensive activities that can be taken advantage of, including a free earthquake database.

6. Modemless Machine to Machine Transfer. Sending information from an IBM to an Apple to a MAC is no longer a mystery. You can send files from machine to machine without a modem using a null modem cable, appropriate protocol settings and communications software.

7. Transferring Graphics Between Incompatible Machines. Using RLE technology, graphics can be designed on almost any computer and transmitted and reproduced on any other computer. Interested individuals can learn about RLE through CompuServe.

8. Ymodem Transfers. Becoming more popular as a transfer protocol, YMODEM can send information at 2-3 times the speed of xmodem. It increases your effective throughput beyond the baud of your modem.

9. Telecommunications Ethics. It is becoming ever important to teach telecommunications ethics in the schools. Guidelines for behavior must be communicated to teachers and students. Guidelines can include concepts such as privacy, etc.

10. Cutting Phone Costs in Half. Using newer centron technologies, your district phone bills can be reduced by a factor of 50% or greater. This technology is available in most communities, requires a minor installation cost, but maintains many advantages such as low cost, and the ability to disconnect for vacation periods with low reinstallation costs.

MICROCOMPUTER SOFTWARE DESIGN: A LEARNING THEORY APPROACH

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ABSTRACT

To improve the quality of educational software, more producers need to analyze learning theories and apply guidelines to the basic design of all CAI software. In this paper, the author has examined theorists from B.F. Skinner to R. Gagne to produce a set of practical guidelines which will enable a novice software producer to markedly improve the quality of the design component. In addition, a paradigm illustrating the software design and development process is described in detail. A major improvement of software design would precipitate increased student learning, escalate student motivational levels, and be a catalyst for increased micro integration activities by teachers, administrators, school media specialists, and educational computing specialists. The improvement of educational software ought to be a major goal of educators as a first step towards a more complete integration plan.

INTRODUCTION

Learning theory can be classified into essentially two major categories, behavioral and cognitive. Each category contains a number of micro design-related constructs.

The behavioral learning theorists, also known as stimulus-response psychologists, are advocates of the theory that learning occurs from the association of responses with stimuli. Skinner researched this process in detail using pigeons in a controlled environment structured to shape the behavior of the birds through selective reinforcement. For example, a software program presenting math problems with immediate reinforcement which triggers more difficult problems would be an application of S-R psychology.

The cognitive learning theorists, also known as Gestalt psychologists, are primarily concerned with internal information processing such as encoding, short-term memory, long-term memory, and retrieval of data. From this psychology, a number of useful constructs are available to the software designer.

LEARNING THEORY PRINCIPLES

Gagne and Briggs (1979) developed three principles from behavioral learning theory that are helpful to the designer of software. The contiguity, repetition, and feedback constructs are particularly useful in designing screens. In addition, Bloom's Cognitive Domain can be very useful in developing software in a sequential and meaningful arrangement. Base concepts can be introduced, applied, analyzed, synthesized, and evaluated in a particular sequence with proper screen design. Gagne also proposed a model classifying tasks into five categories including verbal information, intellectual skill, cognitive strategy, attitude, and motor skill. The application of this system can be seen in the teaching strategy used by some of the more successful CAI programs.

Cognitive theory has been very concerned with the nature of learning. For example, orientation, individualization, and the application of existing information processing skills can all be significantly related to the development of effective educational software.

In addition to this introduction of learning principles, many other constructs will be covered in the presentation at much greater depth. Because of space restrictions, I can only cover some of the highlights from my complete manuscript.

SPECIFIC GUIDELINES

The following guidelines link learning theory to micro software design. They represent major considerations especially useful to beginning producers:

1. Develop CAI in accordance with the internal processes of learning (Gain attention, guide the learner, assess performance, provide feedback, stimulate recall of prior learning) (Hannafin, 1987)

2. Stress for a high degree of interactivity.

3. Provide bridges to prior learning.

4. Include opportunities for learners to integrate content through the use of selective questioning techniques and open-ended learning activities.

5. Provide cues in software design in relationship to the ability and achievement level of the students.

6. Provide ample opportunity to apply new concepts in a variety of different situations.

7. Provide for some learner control. Use modular approach and easy movement forward or backwards through the program.

8. Design aesthetic screens. They should be pleasing to view by using colors effectively along with interesting text and graphic selection.

In conclusion, there many important guidelines based upon learning theory that can aid software designers to produce an effective educational package. The learning theory approach is a key tool for designing first-rate programs.

Potential of LogoWriter for University Students

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Abstract

Logo programming, from beginning to advanced, is taught as one of several electives for graduate students majoring in Instructional Technology at Texas Tech University. This presentation will demonstrate the potential of Logo programming for adult students at the university level and will provide an overview of the integration of Logo and wordprocessing available with LogoWriter.

Introduction

Students seeking an advanced degree in Instructional Technology at Texas Tech University select their program of study from a variety of courses aimed at specific topics in instructional technology. One of the specialized courses centers around the computer language Logo. The class focuses on the educational philosophy behind Logo, strategies for teaching Logo, and the syntax and structure of the language. The class uses the LogoWriter version of Logo which incorporates the use of wordprocessing with Logo programming.

Class Requirements

Each student is required to write an original Logo program as a final class project. Programming projects were designed to include both turtle graphics and list processing, plus the word processing capabilities unique to LogoWriter. The students entered the class with varying levels of previous Logo knowledge but all were able to develop complex projects by the end of the course.

Programs Developed by University Students

Programs developed by graduate students using LogoWriter will be demonstrated in this presentation. Two students with little or no Logo programming or computer experience prior to taking the class wrote the following programs: (1) a history lesson to be used in a small county museum, and (2) a Rebus activity combining nursery rhymes and songs. Both of these programs combine the use of text, turtle graphics, color, music, cartesian coordinates, conditional statements, and stamping new turtle shapes. A third student with little previous experience wrote a dental hygiene tutorial which uses variables, recursion, and multiple turtles in addition to the Logo tactics mentioned above.

Students who were a little more advanced coming into the class wrote the following programs: (1) a math and alphabet drill which incorporates the use of a list of words as a response, list processing, and random numbers; (2) a game which requires the user to use clues to guess the identity of particular animals; and (3) a drill to help children differentiate between opposites such as "above" and "below". This program involved programming special function keys through LogoWriter as well as incorporating most of the previously mentioned commands and strategies.

Students with moderate experience in Logo programming prior to taking the class wrote the following programs: (1) a tutorial program to aid second graders in learning contractions, which includes the concept of position and heading; and (2) a demonstration of Logo to be used with elementary children which is actually a series of programs controlled by a menu. These programs include: (a) a demonstration of turtle graphics with a birthday greeting; (b) color and shapes with a rainbow; (c) three types of symmetry using multiple turtles; (d) animation, text and music in a Logo video; (e) list processing used with turtle graphics to build a family tree; (f) random numbers incorporated into a horse race; (g) using "colorunder" to read and move through a time line showing the progress of computers since 1946; and finally, (h) a mad lib nursery rhyme created with list processing and illustrated with turtle graphics.

Conclusion

The class is designed to instruct teachers in the art of teaching Logo to all ages of children, while at the same time developing the Logo programming skills of those teachers. Adults who are capable of solving complex problems through the use of Logo will consequently possess the skills necessary to teach children how to problem solve when programming with Logo. The programs demonstrated clearly show the development of excellent Logo programming skills by the teachers involved.

The Use of Microcomputers in Psychology Courses

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The use of the microcomputer for teaching follows a long line of development starting with Pressey's teaching machines in 1926. His promising work, a kind of self scoring device that gave immediate results to the learner, was before its time. B. F. Skinner provided the learning theory and programmed instruction, either with or without machines, was born. Now, the microcomputer can work as a teacher or can imitate real situations or can provide practice and drill exercises. Moreover, within psychology, the microcomputer can be used by an experimenter to control events within the research procedure such as presenting signals (called a tachistoscope) to a person serving as a subject. Some of these uses were described. The use of the microcomputer for undergraduate statistics courses was pleasing to the students.

A bit of history: B. F. Skinner (1954), more than any other learning theorist, attempted to develop better ways for students to learn school material. He used concepts from his learning theory that are effective in many learning situations. The special area of behavior modification grew out of his work. In his 1958 article, he described S. L. Pressey's teaching machine and then described the teaching machine he developed. From this widely cited article (1958) to the present time interest in programmed instruction and the improvement of teaching grew. The microcomputer is taking the place of teaching machines and offers much promise in improving education for all of us.

Some current activity: New programs are available for helping students understand psychological concepts, which are sometimes difficult for the beginning psychology student. Psychological concepts are often abstract and difficult for the teacher to present. Computer applications offer the teacher an opportunity to present concepts in classroom demonstrations. The learner is treated as an individual and given actual practice in using concepts from different areas of psychology. Areas range from general psychology, to statistics, experimental psychology, developmental psychology, and even to abnormal psychology and clinical psychology. PI-NET, a data base for psychologists, contains over 400 references for the use of computers in psychology and mental health.

Recent programs include demonstrations of brain research, principles of learning, goal setting, cooperation and competition, and findings from social psychology. One program for abnormal psychology demonstrates the problem of reliability in psychiatric diagnosis (Sadler, 1987). Other rapidly developing areas include study guides, computerized test banks, and the administration and scoring of psychological tests. *Experimental psychology and statistics:* For undergraduate students, the first experience with research comes in a course called experimental psychology. Students conduct experiments, analyze their data, and write reports. Teachers always have problems with equipment used in experiments. Under a National Science Foundation grant, Gregory & Proffel (1985) published a program that allows the microcomputer to serve a number of functions. It can be a reaction time device, it can measure a person's threshold for visual material, it can present material to be learned and test one's memory for tones. Twelve different experiments can be done with the software that controls the computer. Moreover, students can work as a subject and as an experimenter. It's a whole psychology laboratory in four Apple diskettes. My students used three of the programs and a survey showed favorable attitudes about using the computers. There are problems because the computer lab is used by other departments and scheduling becomes difficult. Statistical programs for the microcomputer are available and are used in undergraduate statistics courses. One textbook (Elsey, 1987) comes with a software package. My students liked using the microcomputer for the analysis of some of the more complicated problems. A large number of the students have microcomputers and use them for their courses. I see an expansion of the use of the microcomputer for many other psychology courses.

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Business/Office Education Computer Curriculum for 1988

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An exciting new computer oriented curriculum will be implemented in Office Education for the fall of 1988. Several of the traditional Office Education course titles have both new names and new essential elements. The contents of the guides will be very up-to-date using the lastest sources available. The curriculum guides will be available for the fall semester and those teaching the newly renamed courses will receive training on their use during summer workshop. The changes in the essential elements and the new curriculum content and format will prepare students for the computer society that they will be entering.

For the past two years several groups of experts in computer education, area met and put together a set of essential elements which have now become the new essential elements of the Office Education Computer curriculum. Over the past few years, programs have been redirected from the traditional Office Education courses of pre-employment lab and cooperative programs to word processing programs. Now, many other changes, including new titles, and some new course content will take affect in the 1988 school term.

Office Education has made these changes to keep up with the continuous changing business environment. Being able to use a computer for input has become the key ingredient in securing an entry level position in business.

The essential elements will impact the students of the 1980's and 1990's. They will enter today's business a step ahead of those who have not had training in computer applications, usage, and programming.

The following curriculum guides are being prepared for the fall of 1988: **Business Information Processing** (Replaces Word Processing), **Business Computer Applications I and II** (Replaces Data Processing I and II), **Business Computer Programming I and II** (Replaces Computer Programming I and II), and **Micro-computer Applications** (New Cluster course). There have been changes in both name and in the essential elements in several other Office Education courses, however, they are not being developed at this time.

Carol Sullivan, curriculum specialist and teacher educator, is responsible for the **Business Information Processing** curriculum guide and is also writing several units in the other guides. I am responsible for the **Microcomputer Applications, Business Computer Applications I and II** and for the coordination of the **Business Computer Programming I and II** curriculum guides. There are several data processing adn computer programming teachers who are writing the curriculum in the Business Computer Programming areas. These are the curriculum guides that are contracted out by the TEA for this year.

The latest sources are being used to develop these curriculum guides. Therefore, the guides will include up-to-date information. The classroom teacher is being taken into consideration as the materials are developed and helpful tools for them will be included within the guides. Lesson plans, sponge activities, focus statements, guided practice suggestions, extension strategies, enrichment activities, and closure statements are a few examples. Inaddition, references will be provided for each unit including books, software, and other materials.

The organization of the curriculum guides will be slightly different than in the past. Equipment and software suggestions in several price ranges will also be included.

Advisory committee members from all over the state are involved in field testing the curriculum guides which will be available for the 1988 school year. They represent office education, data processing, programming, personnel from secondary schools, colleges, and businesses. During the summer workshops Office Education teachers will be given the opportunity to obtain assistance in the use of the guides.

The 1988 school term will be an exciting time for Office Education students in Texas. They will be given the tools to become successful citizens, at school, at work, and in our new electronic society.

Improving Vocational Education through Quality Software

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Abstract: Educational software having sound instructional design and appropriate content can be difficult to find, but it is available. Such software is the focus of this presentation. Designed and developed by curriculum specialists with expertise in the areas addressed, it was created with valuable input from vocational teachers, business and industry representatives, and computer technologists. This process helped ensure that the 21 software packages discussed in this presentation make vocational classroom management easier and the teaching/learning process more effective.

As microcomputers play an increasingly important role in our classrooms, the number of available educational software programs continues to grow. However, the poor quality of this software remains a critical concern. Too often it is designed and developed by computer technicians, rather than by educators. And too often the importance of sound instructional design is ignored. This presentation will show conference participants how the software published by the Extension Instruction and Materials Center (EIMC) at The University of Texas at Austin helps provide a solution to these problems and how EIMC's software can be used by teachers to enhance their educational programs.

EIMC is a nationally recognized and respected publisher of vocational curriculum materials that has been in operation for over 40 years. The Center is now in its fourth year of publishing computer software. Curriculum specialists have designed and developed this software to ensure that it is instructionally sound. Vocational teachers and business and industry representatives have been consulted to ensure that the softwares' content is accurate and appropriate. And computer technologists have been consulted to ensure that the capabilities of the microcomputer are maximized.

EIMC currently offers more than 20 classroom management and competency-based computer-assisted instruction programs. These programs are designed for junior high and high school vocational programs, primarily in the areas of Health Occupations Education, Marketing Education, Technology Education/Industrial Arts, and Trade and Industrial Education. However, many of these programs are appropriate for any vocational and/or career-related program, and some are appropriate for special needs students.

Across the United States, teachers have found that EIMC's software makes classroom management easier and the teaching/learning process more effective. For these reasons, the educational software discussed in this session makes an important contribution to the vocational classroom.

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POTPOURRI

This presentation covers a collection of materials that may be used to teach personal computers using word processing and graphics programs. Special learning techniques and strategies that I have utilized in my classroom will enable a beginner with limited computer experience to teach a wide range of special learning needs.

Potpourri will direct you in determining methods, procedures, and instructional strategies that would fit your teaching audience.

The first steps I use in successfully planning a lesson is to: plan, organize, lead and control. The following factors also work best for me in any situation:

1) define your audience
2) locate and define objectives
3) assess availability of materials and supplies
4) present audience with pretest/posttest
5) lecture only when needed
6) use variety
7) use hands on method
8) make supplies easily accessible
9) provide written assignment sheets
10) provide office environment with the teacher as the supervisor
11) rotate the students on all equipment

Instructional strategies that I consider important to use are:
mode - how students and teachers interact with one another.
media - method of presentation.
materials of instruction - actual instructional materials that are used.

Similar approaches can be used to introduce students to a lesson on pc's - use visual mechanics throughout a lesson, discuss and show how computers are used, how the system is organized, equipment used, and how to operate word processing and graphics software. The following areas could be covered when teaching a lesson on the computer:

1) organization
2) planning
3) problem solving
4) procedures
5) production
6) measurement
7) vocabulary
8) keyboarding
9) formatting
10) editing
11) proofreading
12) job standards
13) quality

A number of learning activities can be used to teach computer word processing and graphics. Some activities that I have found helpful are listed below:

1) vocabulary word scrambles
2) vocabulary word mazes
3) information sheets
4) cut and paste graphic activities
5) flash cards
6) scrabble - use computer terms
7) crossword
8) disk joggers

The tips and techniques that I have mentioned can be used to teach anyone interested in computers. If you have just gotten started with your computer, I hope you will find potpourri to be an asset in learning to use your system.